



# Technical Manual

## ESFIRECODER

(including all ESFIRECODER variants)

## Emergency Services Firecoder

9261-7974

## ESFIRECODER - Emergency Services Firecoder

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### ISSUE CONTROL

Issue	Date	Remarks
01	23.01.06	First Issue
02	24.01.06	Production Issue
03	03.04.06	CN10652
04	27.06.06	CN10648
05	15.09.06	Section 10 added
06	26.06.07	ESFIRECODER-1 & ESFIRECODER-2 variants added

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## ESFIRECODER - Emergency Services Firecoder

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### SECTION 1 – INTRODUCTION

This technical manual describing the installation and operation of the ESFIRECODER Emergency Services Firecoder and variants of.

#### 1.1 OVERVIEW

The ESFIRECODER has been designed to meet the requirements for Emergency Service station ends, both Whole time and Retained. The hardware has evolved through 3 generations to the present platform. The software protocols used for communications are the Home Office protocol GD92 version GD-92/1003A/2.2 and the Home Office specification MG4 for alerting. The protocol is a “closed loop” system, thus ensuring message delivery. In addition to system messages, the unit can deliver “unsolicited” messages to a GD92 Network Manager. This gives the system a degree of self-monitoring, essential for an Emergency service. Remote diagnostics/configuration are inherent within the unit.

The ESFIRECODER has Home Office accreditation

The equipment can deliver solutions pertinent to a particular authority by programming the unit to perform the functions required.

The unit is a self contained programmable GD92/MG4 system complete with:

- Router
- Peripheral Agents
- Printer agents
- Communication Agents (LAN/Wan, PSTN, Tetra, etc)
- Wide area agents
- Alerter agent
- File Transfer support using GD92 bearers

The system will accept messages from a control centre and deliver the appropriate message to:

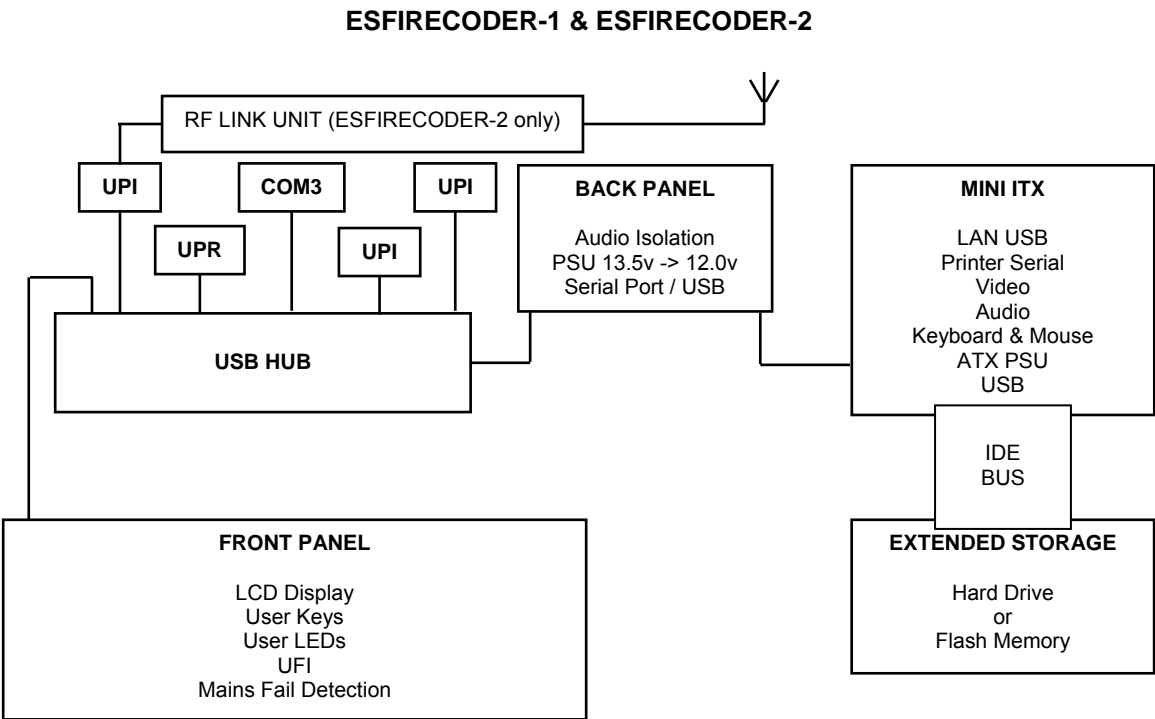
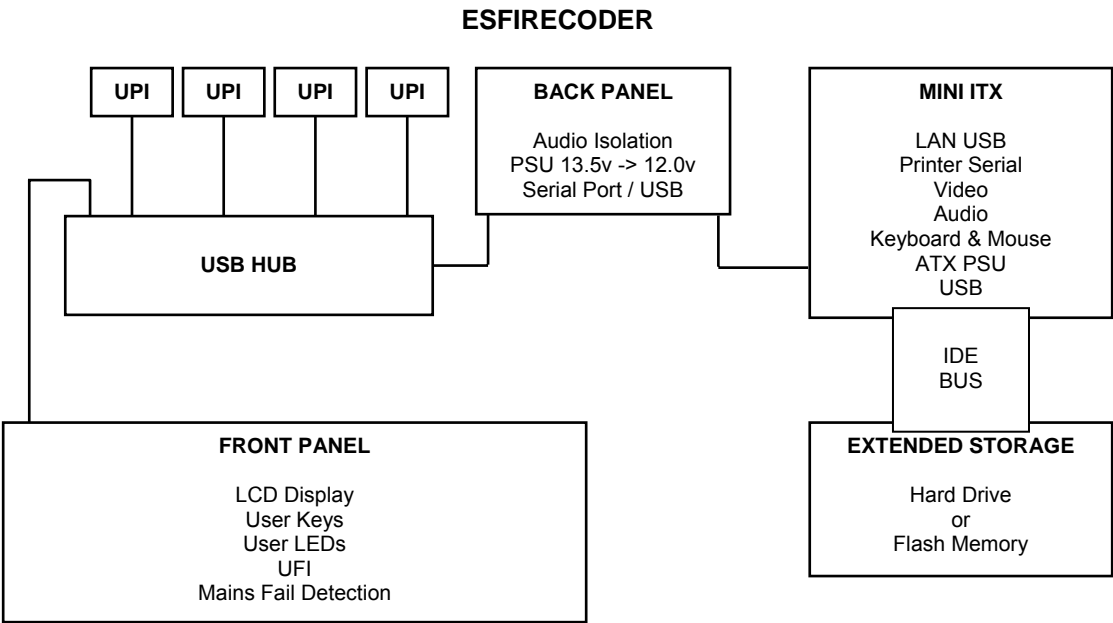
- Alerters
- Printers
- Public address systems
- Message boards
- Peripheral devices

Delivering to the originator acknowledgements of success or failure.

Complimentary to the ESFIRECODER are the Multitone Central Communications Processor (CCP) and the Multitone Network Manager (NSM), both units generally residing in the control centre.

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1.2 BLOCK DIAGRAMS



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### **1.3 UPI - USB PERIPHERAL INTERFACE**

This Technical Manual does not cover this part, for details see Technical Manual 9261-7909

### **1.4 UFI - USB FRONT PANEL INTERFACE**

The Multitone USB Front Panel Interface (UFI) is a USB V1.1 peripheral designed to provide a display and user keys for PC. The UFI appears to the PC to be a standard COM port and uses a simple text protocol (UPIP) for control.

For engineering and test purposes, any PC serial program can be used to send UPIP commands to the UFI.

A UFI can be connected up to 5m from the PC (this is a limitation of the USB interface).

The USB socket provides two diagnostic LED's. The Green LED is normally on when the UFI is active, and flashes off when data is received on the USB port. The Red LED will pulse when the watchdog is updated and flash when the watchdog has timed out.

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### **SECTION 2 - SAFETY WARNING**

#### **2.1 COMPANY LIABILITY**

The information in this manual has been carefully compiled and checked for technical accuracy. Multitone Electronics plc accept no liability for inaccuracies or errors. In line with the company policy of technical advancement, the information within this document may be changed. The user should ensure that the correct issue of the document is used. Comments or correspondence regarding this manual should be addressed to:

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#### **2.2 SAFETY SUMMARY**

The following information applies to both operating and servicing personnel. General Warnings and Cautions will be found throughout the manual where they apply.

WARNING statements identify conditions or practices that could result in personal injury or loss of life.

CAUTION statements identify conditions or practices that could result in equipment damage.

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### **SECTION 3 - TECHNICAL SPECIFICATIONS**

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- 3.1 PHYSICAL SPECIFICATIONS**
- 3.2 ELECTRICAL SPECIFICATIONS**
- 3.3 ENVIRONMENTAL SPECIFICATIONS**
- 3.4 FRONT PANEL ACCESS FACILITIES**
- 3.5 BACK PANEL I/O PORT FACILITIES**
- 3.6 BACK PANEL WIRING SCHEMATICS**

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### 3.1 PHYSICAL SPECIFICATIONS

Weight	7.1 kgs
External dimensions (H x D x W)	132 x 422 x 483 mm
Housing material	Mild Steel (Zinc plated and passivated)

### 3.2 ELECTRICAL SPECIFICATIONS

#### 3.2.1 Input 3 Pin XLR

- Input Voltage 24v DC Nominal (22v DC – 30v DC)
- Input Current - dependant upon power source & ancillary attachments

#### 3.2.2 Ancillary Output Voltages

- 3 x 3 Pin XLR 24v DC Nominal - fused options up to 8A
- 2 x 4 Pin XLR 13.5v DC Nominal - fused options up to 8A

#### 3.2.3 The unit draws 700ma quiescently

### 3.3 ENVIRONMENTAL SPECIFICATIONS

#### 3.3.1 Temperature

- Operating Range 0°C to +50°C
- External forced cooling required above +40°C

#### 3.3.2 Humidity

- Up to 90% RH (Non-condensing)

### 3.4 FRONT PANEL ACCESS FACILITIES

- Two Line LCD Status Display
- Local Activation of User Defined Menu Options
- Manual Acknowledgement & Reprint Facility
- Six Status LEDs
- Three User Defined LEDs

### 3.5 BACK PANEL I/O PORT FACILITIES

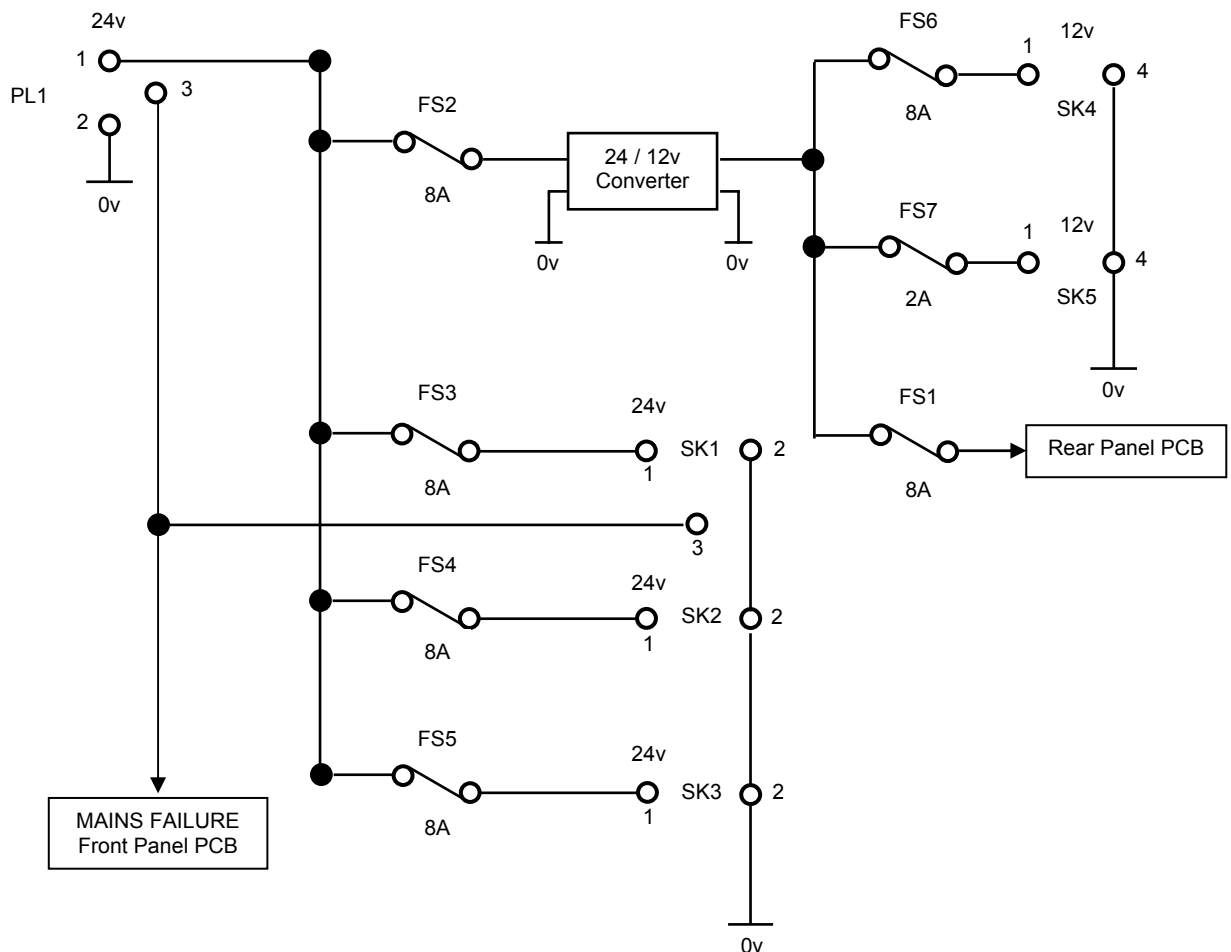
- 4 x UPIs (USB Peripheral Interfaces)
- 2 x RS232 Serial Ports
- 1 x PS2 Mouse Port
- 1 x PS2 Keyboard Port
- 1 x Parallel Port
- 1 x RJ-45 LAN Port



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- 1 x VGA Port
- 2 x USB 2.0 Ports
- 3 Audio Jacks
  - Line In
  - Line Out
  - Microphone In
- 2 x Transformer (600  $\Omega$ ) Isolated Line Out (Left & Right)

### 3.6 BACK PANEL WIRING SCHEMATICS



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### **SECTION 4 - USER GUIDE**

No user guide is available for this product.

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### SECTION 5 - INSTALLATION & COMMISSIONING

#### WARNING

Do not install / use the equipment in areas where explosive gases may be present.

#### CAUTION

Do not install / use the equipment where it may be exposed to liquids, strong magnetic fields, extreme temperatures or strong sunlight.

#### 5.1 UFI - USB FRONT PANEL INTERFACE

The UFI requires a set of PC drivers for operation. These are standard drivers, and can be downloaded from the FTDI web site at <http://www.ftdichip.com/FTWinDriver.htm> or can be loaded directly using the Windows Online update facility. Only a single set of drivers need be installed no matter how many UFI's are connected to a system.

Once installed, the UFI is automatically assigned a COM port. This may be changed using the Windows Control Panel, and it is recommended the COM ports from 10 upwards are used to avoid any conflicts with existing COM ports. Standard allocations are:

ESFIRECODER	
COM Port	Peripheral
COM 10	Console Agent (UFI)
COM 11	1 <sup>st</sup> Peripheral Agent (UPI)
COM 12	2 <sup>nd</sup> Peripheral Agent (UPI)
COM 13	3 <sup>rd</sup> Peripheral Agent (UPI)
COM 14	4 <sup>th</sup> Peripheral Agent (UPI)

ESFIRECODER-1 & ESFIRECODER-2	
COM Port	Peripheral
COM 10	Console Agent (UFI)
COM 11	1 <sup>st</sup> Peripheral Agent (UPI)
COM 12	2 <sup>nd</sup> Peripheral Agent (UPI)
COM 3	3 <sup>rd</sup> Serial Port
COM 15	4 <sup>th</sup> Printer Agent (UPR)

Please note that if FTDI's D2XX drivers are installed on the PC, they must be removed following FTDI's instructions prior to installing the required VCP drivers. Drivers for Linux operating systems are also available from the FTDI web site.

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### 5.1.1 Operating Mode

The UFI provides an interface to a 2 line, 24 character LCD display, up to 5 buttons, 3 input channels and up to 6 LED's. A watchdog is also provided for the PC - once enabled, if the watchdog is not updated every few seconds, the PC will automatically be rebooted.

### 5.1.2 UPIP Protocol

Each UPIP command sent to or from the UFI consists of a standard ASCII text line followed by a CR (0D hex). A command will normally produce one or more lines of response, generally starting with a lower case letter.

The first letter of the line determines the command type.

Command	Response	Notes
Sh{h}	ohhhh	Set one or more outputs
Rh{h}	ohhhh	Reset one or more outputs
Ohhhh	ohhhh	Set ALL outputs
Ttext	ohhhh	Send text to display
Bhh	bhh	Backlight control
Uttttttt	u	User defined display character
Wh	w	Watchdog control
A	error	Prevent modem detection
E	en	Echo command input
M	mF	Return operating mode
Q	o00hh	Query Status
I	i00hh	Read Buttons/Inputs
V	vversion	Get software version
Ntext	ntext	Save/Read Non-Volatile text
Gtext	ghhhhhhhh	Generate Key
L	l status	Loop back test

Where:

hhhh is a 16 bit hex word, expressed as four hex characters

hh is a 8 bit hex byte expressed as two hex characters

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### Sh{h} - Set Command

This command, when followed by one or more hex characters, will set one or more outputs, for example "S046" will set outputs 0,4 and 6 leaving the others unchanged.

### Rh{h} - Reset Command

This command, when followed by one or more hex characters, will reset one or more outputs, for example "R17" will reset outputs 1 and 7 leaving the others unchanged.

### Ohhhh - Output Command

This command sets all outputs to the states specified in the four following hex characters. The O, S and R commands will reply with the current output states as "ohhhh". Outputs 0..5 correspond to the front panel LED's as follows:

Channel	LED
0	User 1
1	User 2
2	User 3
3	Fault
4	Flash Red (Mains Fail)
5	Flash Green (Low Battery)

### Ttext - Text for Display

This command allows text to be sent to the display, so it is only valid when the unit is in front panel mode. Up to 250 characters may be sent in a single line. The following special display control commands are available:

Character	Function
\ f	Clear Display
\ r	Move cursor to start of line 1
\ n	Move cursor to start of line 2
\ t	Clear to end of line
\\	Display a single \ character
\ u	Display user defined symbol
\ d	Display 'delete' symbol

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### Bhh - Backlight Control

The backlight defaults to coming on whenever a text is sent to the display. This can be modified using this command:

Command	Function
B00	Backlight always off
B01	Backlight on for 1 second
B02	Backlight on for 2 seconds
...	
BFE	Backlight on for 254 seconds
BFF	Backlight always on

### Uttttttt - User Defined Character

A single character (**\u**) on the display can have a user-defined font using this command. Eight characters are used; the low 5 bits of each define each of the 8 rows of the character. If no user-defined character is stored, a diamond is displayed. This information is stored in non-volatile memory.

### W - Watchdog Control

The watchdog can be enabled, disabled or reset using this command

Character	Function
W	Reset Watchdog Timer
W0	Disable Watchdog
W1	Enable Watchdog, 1 second timeout
...	
WF	Enable Watchdog, 15 second timeout

If the watchdog is enabled, but not reset within the configured time, the reset output will be asserted to reset the PC.

### I - Input Command

This command will request the current input states, returning **i00hh**. It is normally not needed as an **i** status line will be sent whenever an input changes. Input bits:

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Channel	Function
0	"Back" Button
1	"Fwd" Button
2	"Exec" Button
3	"ManAck" Button
4	"Repeat" Button
5	Input 6 Asserted (Active Low)
6	Input 7 Asserted (Active Low)
7	Input 8 Asserted (Active Low)

### E - Echo Control

For machine driven applications, echoing the command input is not always helpful. This can be disabled by sending a **E0** command and re-enabled by sending a **E1** command.

### V - Version Request

This command causes the UFI to respond with its current software version, preceded by a **v**

### Q - Query

This command returns the current input and output channel states.

### A - Anti Modem Detection

In order that a UFI will not be confused by PC software automatically scanning for dial up modems, any command starting with an A (e.g. 'AT') will return **error**.

### Gtext - Generate Key

For special applications, the UFI can generate a 32 bit key based on the text supplied in this command. There must be at least 8 characters of text supplied, and the unit will only generate a certain number of different keys in any time period. The key is returned as 8 hex characters, e.g. **ghhhhhhh**.

### Ntext - Save/Read Non-Volatile Text

For special applications, the UFI can store a string of up to 32 characters in its non-volatile memory. If a string is supplied, it is stored, if not, the last stored string is returned.

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### **Ptext - Save Powerup Text**

When the UFI powers up, it displays its version string and **Initialising**. This command can be used to store an alternative message (up to 64 characters) to display until the main application is running.

### **L - Loopback Tests**

These tests are to check the basic UFI hardware is working correctly, and while running, will cycle through the outputs. If a button is pressed, it will be displayed and shown on the PC. The test will timeout after a few seconds if no button is pressed.



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### SECTION 6 – ESFIRECODER SOFTWARE

#### 6.1 MULTITONE GD-92 FIRECOMMS+

The Multitone GD-92 Firecomms+ system consists of a software suite that uses the GD-92 protocol to link various systems via one or more bearers. Systems can communicate with the real world using a variety of agent types.

The system currently consists of three different programs with the main communications program being available in two formats:

- MFWC is the main communications program that runs on Windows systems, normally as a system service. This program runs the various user agents and message transfer agents that make up a GD-92 system, and would normally be configured to run continuously.
- MFWL is the same communications program built to run on Linux systems. (Future Product)
- MFW is the engineering front-end program that runs on Windows systems and is used to configure, test and monitor the system.
- MFU is a user front end program that runs on Windows systems and is used to configure, test and monitor the system.
- MFWS is a small application that provides a simple full screen display for a Windows (Windows 2000, XP or later) system

The engineering and user programs are connected to a communications program by an IP link, and each will often be on different systems.

##### 6.1.1 MFWC - Firecomms Communications Software

MFWC is a program that runs on 32 bit Windows systems; Windows 2000, XP or later and runs the actual Firecoder communication system.

It can be run from the command line, or installed as a system service.

MFW is used to configure, monitor and test the system.

##### 6.1.1.1 Command Line Operation

MFWC can be run from the command line (or by double clicking on the program in an explorer window, or of course using a Windows shortcut). In this mode, basic logging information will be shown on the screen. If the system is shutdown, or the current user logs off, the program will be correctly shutdown.

Normally, the directory and configuration to use will be supplied as a parameter when the program is run.

Example Commands:

- MFWC**
- MFWC config**
- MFWC path\config**
- MFWC \\machine\path\config**

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### **MFWC d:\path\config**

### **MFWC d:\path**

With no parameters, MFWC runs using the default configuration in the current directory.

If a configuration file is specified (optionally with a relative or absolute path), then that directory/file will be used instead. UNC filenames are also supported.

If you wish to specify just a directory but still use the default configuration name, ensure that there is trailing slash on the config name, otherwise the parser will use the 'last' folder name as the configuration file name.

In operation, MFWC displays basic system activity. **F10** or **Alt-X** will terminate the program.

### 6.1.1.2 System Service

MFWC can also install itself and run as a system service. In this case, there is no visible output, but the program can be set to run at start-up with no user logged in. The service will also be automatically terminated when the system is shutdown.

A local or remote copy of MFW can communicate with it for program set-up.

Service commands:

**MFWC -install config**

**MFWC -install path\config**

**MFWC -install \\machine\path\config**

**MFWC -install d:\path\config**

**MFWC -remove**

**MFWC -stop**

**MFWC -start**

These commands control the operation of MFWC as a system service.

The **-install** switch will install and automatically start the service (and it will restart on the next boot). Ensure a valid configuration is supplied, otherwise the program will use the default configuration name in the same directory as the program itself.

The **-remove** switch will stop the service and remove it from the system table.

The **-start** and **-stop** switches will start and stop an installed service. These can be useful for software upgrades; the service can be stopped, the .exe updated, then restarted.

This program will also be available to run on Linux systems - see MFWL for more details.

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### 6.1.2 MFW - Firecomms Engineering Software

MFW is a program that runs on 32 bit Windows systems; Windows 2000, XP or later. It communicates with a **Firecoder** or a **Firecomms System** program using an IP link, and can be used to configure, test and monitor a system either locally or remotely.

MFW can also send basic GD-92 commands to older systems via a **Firecoder** or a **Firecomms System**.

### 6.1.2 MFU - Firecomms User Interface

MFU is a program that runs on 32 bit Windows systems; Windows 2000, XP or later. It communicates with a Mobilise Agent on a **Firecomms System** using an IP link, and can be used to send commands to, and receive status messages from, the system.

### 6.1.3 MFWS – Firecomms Full Screen Display

MFWS is a program runs on 32 bit Windows systems; Windows 2000, XP or later. Normally MFWS would be driven by a **Display Agent**, but in principle, it can be driven by any program capable of sending text to it.

## 6.2 ROUTER AGENT

### 6.2.1 Brigade/Node Number/Names

The brigade number is assigned by the Home Office, and is unique for each brigade. Each node in a brigade **MUST** have a different node number. When changing the brigade or node number, remember that the node will then only respond to commands sent to the new brigade/node number once that node has been reset.

The Node Name contains the text name of the current node. The Station Code contains a short name for reports - this string is also included in the name of log files saved to disk.

### 6.2.2 Software Version

This shows the current node software version.

### 6.2.3 Router Table

The router table at a node describes the routes available by each bearer type from this node to other nodes, either directly or indirectly via a directly connected node.

A separate entry is required for each bearer type; the preference parameter specifies the order in which the routes will be tried (1=Highest). Only routes with the "Used" flag set to "Y" will be used.

To specify a route to a destination directly connected to this node, specify the destination in the 'NextNode' field and leave the 'Destination' field set to zero.

If a range of nodes is directly connected to this node via the same bearer type, leave the 'NextNode' field set to zero and specify the range of addresses that are directly connected in the 'Destination' field.

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For bearers capable of broadcast transmission (normally just some radio bearer types), leave the 'NextNode' field set to zero and specify the range of addresses the bearer is connected to in the 'Destination' field.

For an indirect route, the 'NextNode' field contains the node address of the node actually connected to this node; the 'Destination' field specifies the range of nodes accessible (directly or indirectly) from 'NextNode'.

### 6.3 PSTN/GSM/ISDN/WAN Tables

#### 6.3.1 Dial-up table

The dial-up tables at a node tell the router which number a particular bearer should use to connect to a node.

NextNode	- Next node address
Number	- Number (or NUA) for the NextNode
Used	- Set to "Y" if entry used, "N" or blank if not.
	- Set to "U" if entry is used but unavailable.
Hold	- Maximum hold time (seconds) for that node.

If the hold time is not zero, the link will be disconnected when the link is unused for longer than the hold time.

#### 6.3.2 Radio Table

The radio tables are used by various agents to lookup the external address or channel of the node.

Used	- Set to "Yes" if this line is used.
NextNode	- Next node address
Number	- Number for the node
Used	- Set to "Y" if entry used, "N" or blank if not.
	- Set to "U" if entry is used but unavailable.
Hold	- Maximum hold time (seconds) for that node.

### 6.4 Max Data Length

This parameter specifies the maximum message length that is sent by this node.

It should normally be set to 1023 unless bearers with limited maximum message lengths are used.

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A message longer than this parameter will still be processed by the node; this parameter primarily controls the number of parameters returned in a message and the length of printer message blocks.

### 6.5 Primary/Secondary Network Manager

If a node needs to send an unsolicited message advising of a bearer status change (e.g. link failed), these parameters specify the destination of these messages.

If a message sent to the Primary Network Manager fails to route at a node, it will automatically be re-routed to the Secondary Network Manager address if this is specified.

### 6.6 Unsolicited Message Address & Priority

If a user agent detects a change in status and needs to inform someone, the address is used as the destination for the unsolicited message. These are normally generated as follows:

Peripheral agents:	Input active and alarm messages.
Printer agents:	Printer on/off line/out of paper.
Alerter agents:	Local alerts made, transmitter errors

Normally, all unsolicited messages are sent with message priority 3. For specific applications, the priority field allows any priority from 1 to 9 to be used for these messages.

If this field contains 0, the default priority is used.

The combination of this parameter and the "Test" priority facility of the MTA's can be used to direct unsolicited messages via specific bearers.

If the Network Tester is used, the upper digit of this field can be used to specify the priority of failure messages sent to the mobilising system.

### 6.7 No\_ACK Timeout

This parameter specifies the maximum number of seconds that an application waits for a response to a command. It is only used for "applications" (e.g. the standby alerter) rather than fire stations.

### 6.8 Manual Acknowledge Timeout

This parameter specifies the maximum number of seconds that a user agent should wait for a manual acknowledge to a command.

### 6.9 Data-log Everything

Each Multitone node logs events to a time stamped history log. If this parameter is set to "Yes", then all events will be logged. If is set to "No", certain basic events will not be logged:

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Messages transmitted and received.
Station inputs changing from "On" to "Off"
Data blocks printed.
Transmitters "On" and "Off"
Coverage and out-of-range calls.

### 6.10 Agent Manager

All agents have an Agent Manager, that monitors events from that agent and selected GD-92 messages sent to the agent. Either can be used to trigger other actions to happen, via either local or remote agents.

When the Agent Manager processes an event or message, the Agent Manager configuration is scanned from the top for a matching expression. If a match is found, the specified action(s) are carried out and processing finishes. However, if the keyword "CONTINUE" is included on a matching line, scanning will continue through the configuration.

An expression may extend over several lines, and contain one or more comparison statements and one or more command statements. If more than one comparison statement is used, ALL must match for that expression to be valid.

The Agent Manager is also called once per minute in order to match time-based commands. This allows events to be triggered purely on time and day of the week.

Comments may be included, by starting the line with a hash (#). Blank lines are ignored.

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### 6.11 Event/Message Keywords:

IF	Start of an expression
TIME hh:mm-hh:mm	TRUE if current time is in range specified
TIME hh:mm	TRUE at that exact time only
MONDAY TUESDAY WEDNESDAY THURSDAY FRIDAY SATURDAY SUNDAY	Normally, the day of week is ignored but if ANY of these keywords are included, the expression is only matched if the current day is ANY of the days specified
WEEKDAY	This is a shortcut for <b>MONDAY-FRIDAY</b>
WEEKEND	This is a shortcut for <b>SATURDAY-SUNDAY</b>
SOURCE b:n:p	Matches a source address
SOURCE b:n:p-b:n:p	Matches a source address range, where <b>b</b> = brigade, <b>n</b> = node, <b>p</b> = port. Use a * anywhere for a wildcard. e.g. <b>*:30, 10:100:*-10:299:*</b> Each section is compared independently
TEVENT hh:mm	Specifies a timed event
TEVENT hh:mm-hh:mm	Specifies an event for each minute in range
EVENT evnt	Matches an event generated by the agent
EVENT evnt*	Wildcard match an event (See detailed list of event codes later)
PERISTAT	Matches any peripheral status message
PERISTAT x1xxx0xx	Matches a particular status message Each character matches an input 0..15 in sequence: <b>0</b> = Channel 0, <b>1</b> = Input 1, <b>x</b> = Don't Care
TEXTMSG	Matches <b>ANY</b> text message
TEXTMSG n	Matches the first block of a text message starting with number <b>n</b> , e.g. TEXTMSG 20 would match <b>20Status Update</b>
TEXTMSG "tok1 tok2,..."	Matches sequential tokens specified in the first block of a text message e.g. "Zone Alarm" would match <b>"This is a Zoned Alarm"</b> A # will match one or more numbers, so "Zone #" would match <b>Zone 43, Zone 999</b> etc
MOBSMSG	Matches <b>ANY</b> mobilise message
PAGEMSG	Matches any Page_Officer message

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PAGEMESG r	Matches Page_Officer message with RIC matching r r may include * as a wildcard, e.g. <b>12345*</b> , <b>123****</b>
ALRTSTAT	Matches any alerter status message
ALRTSTAT xx	Matches an alerter status message <b>xx</b> Asterisks can be used as wildcards in either character. Examples: <b>fa, t*, x*, **</b>
MOBSTAT	Matches any mobilise status message
MOBSTAT x	Matches mobilise status message 'x' <b>1</b> = MobStat 1 ... <b>8</b> = MobStat 8 <b>a</b> = MobStat a ... <b>h</b> = MobStat h
PRNTSTAT	Matches any printer status message
PRNTSTAT n	Matches printer status message 'n' <b>0</b> = Off Line, <b>1</b> = Paper Out, <b>2</b> = On Line
MTASTAT	Matches any MTA status message
MTASTAT n	Matches MTA status message type 'n' <b>0</b> = Idle, <b>1</b> = Online, <b>2</b> = Shutdown, <b>3</b> = Fault, <b>4</b> = Modem Error, <b>5</b> = Engaged, <b>6</b> = No Carrier, <b>7</b> = No Answer, <b>8</b> = No Dialtone, <b>9</b> = No Logon
RESET	Matches any reset message
RESET n	Matches reset message type 'n' <b>0</b> = Requested, <b>1</b> = Software, <b>2</b> = Power On
AND	Joins multiple statements together

### 6.12 Command Keywords:

TIMER t = n	Set timer t to expire after n seconds
TIMER t1 = n1, t2 = n2	Set multiple timers. Set n = 0 to stop timer
PRINT "message"	Prints message to default printer
PRINT addr "message"	Prints message to address specified <b>addr</b> is in the form brig:node:port The GD92 priority of the message can be set by appending " <b>p</b> " to <b>addr</b> , where <b>p</b> is 1 to 9, e.g. 99:99:30,5
DISPLAY "message"	Sends message to default mobs agent
DISPLAY addr "message"	Sends message to address specified
PAGE ric "message"	Send admin page to <b>ric</b> using the default Alerter.
PAGE ricM "message"	Send page to <b>ric</b> using the default Alerter. <b>M</b> sets the MG4 priority and may be <b>E,P,R</b> or <b>A</b> .



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PAGE team "message"	Send page to <b>team</b> using the default Alerter. If no message is required, then the quotes must still be supplied.
PAGE addr dest "message"	As above, but pages using an Alerter at <b>addr</b> .
SEND dest "message"	Sends page to the default Paging Agent. <b>dest</b> is one or more destinations or commands accepted by the paging agent seperated with commas.
SEND addr dest "message"	As above, but uses a Paging Agent at <b>addr</b>
PLAY "file"	Play sound file specified on default Sound agent
PLAY "file1,file2"	Play sound files specified
ACTIVATE n	Activate channel <b>n</b> on default peripheral agent
ACTIVATE xxxx	Activate multiple channels (hex)
ACTIVATE addr cmd	Activate channels on other peripheral agent
DEACTIVATE n	Deactivate channel <b>n</b> on default peripheral agent
DEACTIVATE xxxx	Deactivate multiple channels (hex)
DEACTIVATE addr cmd	Deactivate channels on other peripheral agent
SENDPERISTAT n	Send Input Peripheral Status with channel <b>n</b> active to Network Manager
SENDPERISTAT xxxx	Send Input Peripheral Status <b>xxxx</b> <sub>hex</sub> to Network Manager
SENDPRNTSTAT n	Send Printer Status <b>n</b> to Network Manager 0 = Off Line, 1 = Paper Out, 2 = On Line
REPEAT	Send <i>Repeat Message</i> command to default printer agent
SENDMTASTAT dest n	Send MTA Status Change <b>n</b> to an MTA 1 = Idle/On-Line, 2 = Shutdown
EMAIL dest "msg"	Send email to destination with message. This uses the default Email agent.
COPY addr	Copy original message to address
CONTINUE	Continue scanning after a match was found
COPY address	Copy original message to address
REQTIME address	Request clock time from address specified
END	Terminates an expression

For those commands that have a **default agent**, the Agent Manager will use the agent of the appropriate type on the local system with the lowest port number. This can be changed to any other agent, either on the local system or a remote system, by adding a suitable entry to the Destination Table with the form **DFLT\_agentname** with the GD-92 address of the agent.

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Notes The page command will use an Alerter\_1 agent type if no Alerter\_2 type is found.

The Agent Manager for a Peripheral or Console Agent will default to sending ACTIVATE and DEACTIVATE commands to itself unless a destination for the message is specified.

PRINT	DFLT_Printer
DISPLAY	DFLT_Mobilise
PAGE	DFLT_Alerter_2 or DFLT_Alerter_1
SEND	DFLT_Paging
PLAY	DFLT_Sound
ACTIVATE	DFLT_Peripheral
DEACTIVATE	DFLT_Peripheral
EMAIL	DFLT_Email

### 6.13 Agent Events: Peripheral/Console /Remote Console/Button Box Agents

This agent type will send the following events to the agent manager:

chan:On	Channel On
chan:Off	Channel Off
chan:Wait	Wait before turnoff
chan:Regen	Regenerated message sent
chan:Moni	Channel monitored OK
chan:Fail	Monitoring failed
chan:Mobi	Channel mobilised
chan:Actv	Channel activated
chan:Deac	Channel deactivated
Command:n	UFI Front Panel command
Command:Fx	Button Box Fire (x = A, B, C, AB, AC, BC, ABC)
Command:Tx	Button Box Test (x = A, B, C, AB, AC, BC, ABC)
Command:FT	Button Box Engineering Command
Tones:xxxx	Tone Sequence <b>xxxx</b> received from LPI

**chan** is the configured name of the channel, but with any spaces changed to underscores.

A **chan:Wait** event is sent 60 seconds before an output turns off. However, if the configured time for the output is less than 60 seconds, the event is sent when half the time has elapsed.

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As an asterisk (\*) is used for a wildcard string match, any DTMF \* codes are sent to the Agent Manager as **S**(tar) characters, and any DTMF # codes are sent as **H**(ash).

### 6.14 Agent Events: Alerter\_2 Agents

This agent type will send the following events to the agent manager:

MG4:xx	MG4 error
Alrt:Fx	Fire Call (x = <b>A..J</b> )
Alrt:Tx	Test Call (x = <b>A..J</b> )
Alrt:PE	Emergency Officer Page
Alrt:PP	Priority Officer Page
Alrt:PR	Routine Officer Page
Alrt:PA	Admin Officer Page
Alrt:PN	Engineering Page
Covr:On	Coverage Test On
Covr:Off	Coverage Test Off
Engn:x	Engineering Command

This agent will send a Page\_Officer message to the Agent Manager for every original page actually transmitted by the agent (i.e. not including repeats). This is done following any directory translation and expansion.

The source address of the Page\_Officer message will be the original source address of the command sent to the Agent, or in the case of internally generated Coverage pages, the address of the alerter agent itself.

This facility would typically be used to forward a "fill-in" page to another alerter. To assist in this, the GD-92 call type (normally **Alpha** or **Numeric**) is set to the beep code (**1-8**) of the locally sent page.

On receipt of this special message type, the destination alerter will override the default beep code for that call type and send a page with the same beep code and message format as the original call.

### 6.15 Agent Events: Paging Agent

This agent will send the following events to the agent manager:

Event	Action
Page:Successful	Page Successful
Page:Unconfirmed	Unconfirmed Page Complete
Page:Failed	Page Failed
Page:<error_text>	Page Failed with specified error text

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A failure will produce both a Page:Failed event AND a specific Page:<error\_text> event, where <error\_text> is a standard GD-92 error code but with all non-alphanumeric characters replaced with underscores, e.g.

Page:No\_Bearer

Page:TXA\_Fail

Page:TXB\_Fail

Page:Encoder\_Fail

This agent will also pass all incoming Page\_Officer messages to the Agent Manager for optional processing with the PAGEMESG command.

### 6.16 Agent Events: Paging Input Agent

This agent will send the following events to the agent manager:

Event	Action
Link:Fail	Link to external system failed
Link:OK	Link to external system OK

This agent will pass all incoming Page\_Officer messages to the Agent Manager for optional processing with the **PAGEMESG** command.

### 6.17 Agent Events: Sound Agent

This agent type will send the following events to the agent manager:

Play:sound	Play sound specified
Queue:sound	Queue sound specified
NoFile:sound	No file found for sound
Gate:On	Audio Gate On
Gate:Off	Audio Gate Off

The Audio Gate is activated **before** the agent plays any sounds, and is deactivated **after** all sounds have been played.

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### 6.18 Agent Events: Network Manager

The Network Manager has no specific events associated with it, but will acknowledge and pass the following message types to the Agent Manager:

MTA Status	MTASTAT
Printer Status	PRNTSTAT
Peripheral Status	PERISTAT
Alerter Status	ALRTSTAT
Page_Officer Message	PAGEMESG
Text Messages	TEXTMESG
Reset	RESET

### 6.19 Agent Events: Mobilise Agent

This agent will send the following events to the agent manager:

Event	Action
Link:OK	Link to PC OK
Link:Fail	Link to PC failed

### 6.20 Agent Events: Printer Agent

This agent type will send the following events to the agent manager:

Mobs	Mobilise Message Received
Admin	Administration Message Received
Mobs:n	Mobilise Message type <b>n</b> Received
Mobilise:n	Mobilise Message type <b>n</b> Printed
Callsign:xxxx	Callsign <b>xxxx</b> Printed
Repeat:n	Repeat Mobilise Message type <b>n</b> Printed
RepeatCall:xxxx	Repeat Callsign <b>xxxx</b> Printed
Finish:n	Finish Mobilise Message type <b>n</b> Printed
Firetype:xxxx	Mobilise Fire Type <b>xxxx</b>
Wholetime:xxxx	Type 6 Wholetime Mobilise turnout type <b>xxxx</b>
Retained:xxxx	Type 6 Retained Mobilise turnout type <b>xxxx</b>
NoPower	No Printer Power

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NoPaper	No Printer Paper
Offline	Printer Offline
Error	Printer Error
PaperLow	Printer Paper Low

This agent will also pass incoming text and mobilise messages to the Agent Manager for optional processing with the **TEXTMESG** and **MOBSMESG** commands. If the printer status changes, a **PRNTSTAT** message will also be sent to the Agent Manager.

Message Type 6 turnout types:

• Standard	• Batched	• Standby-Home
• Motorway	• Standard-Home	• Pre-Alert.
• Standby	• Motorway-Home	

### 6.21 Agent Events: Scroll-board Agent

This agent has no specific events associated with it, but will pass all incoming text messages to the Agent Manager for optional processing with the **TEXTMESG** command.

### 6.22 Agent Events: Message Transfer Agents (MTA's)

Each time the status of an MTA changes, the following events will be sent to the Agent Manager:

MTA:Idle	MTA Idle
MTA:Dial	MTA Dialling
MTA:Fail	MTA Failed
MTA:Conn	MTA Connecting
MTA:Answ	MTA Answering
MTA:Lstn	MTA Listening
MTA:Incm	MTA Incoming connection
MTA:Unkn	MTA Unknown number
MTA:Voic	MTA Answering Voice Call
MTA:OnLn	MTA Online
MTA:Falt	MTA Fault
MTA:OffL	MTA Offline
MTA:Busy	MTA Busy

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MTA:Shut	MTA Shutdown
Fail:Modem_Error	Modem Failed
Fail:Line_Engaged	Line Engaged
Fail:No_Carrier	No Carrier
Fail:No_Answer	No Answer
Fail:No_Dialtone	No Dial-tone
Fail:Modem_Blacklisted	Number Blacklisted
Fail:No_Logon	Logon Failed

### 6.23 Agent Events: Router

Each time that a system status bit changes, an event message is sent to the **Router** Agent Manager as follows:

Event	Action
Mains_Fail	Mains Power Failed
Mains_OK	Mains Power Restored
Battery_Low	Backup Battery Low
Battery_OK	Backup Battery OK
ManAck_Wait	Waiting for ManAck
ManAck_OK	ManAck Acknowledged
System_Fault	System Fault (Transmitter Error)
System_OK	System OK
DupSys_Active	Duplicate System Active
DupSys_InActive	Duplicate System Inactive

Example:

IF EVENT Mains\_Fail THEN PLAY "POWERFAILED" END

Do not confuse these events with the system status keywords, which are used to qualify an expression:

IF PAGEMESG AND DUPSYS\_ACTIVE THEN PLAY "PAGING" END

### 6.24 Message Formatting

For the **PRINT**, **DISPLAY**, **PAGE**, **PLAY** and **EMAIL** commands, when a message is constructed, it may include information from the original message by including one or more of the following tokens:

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\$O	Expand source address to dotted notation ( <b>12.34.56</b> )
\$A	Expand source address to normal text ( <b>12:034:56</b> )
\$N	Convert source address to node name (" <b>Station</b> ")
\$U	Expand source node number to numeric ( <b>34</b> )
\$P	Expand source port number to numeric ( <b>56</b> )
\$S	Include status parameter from incoming message
\$M	Include message parameter from incoming message
\$E	Expand to telephone number from MTA status message
\$R	Expand to remote node name from MTA status message
\$D	Expand to current date ( <b>01-Feb-05</b> )
\$T	Expand to current time ( <b>12:34:56</b> )
\$L	Expand to new line

The text produced by **\$S** depends on the original message type:

Event	Event Status (text after colon)
PeriStat	Input names of mask (numbers if no room)
TextMesg	Standard: Contents of incoming message after number
TextMesg	Enhanced: All matched digits in message
Reset	<reset_reason> in text form
AlrtStat	<alerter_status> as 2 text characters
PrntStat	<printer_status> in text form
MTAStat	<MTA_status> in text form
PageMesg	<pagenumber> in text form

The text produced by **\$M** depends on the original message type:

Event	Event Message (text before colon)
AlrtStat	<alerter_status> in long text form
TextMesg	Contents of incoming message.
PageMesg	Original message

Note that standard GD-92 Systems will only generate MTAStat messages with a <MTA\_status> of 0,1,2 or 3. Extended MTAStat messages indicate transient dial-up fails and are only generated by Multitone Equipment and then only if "Notify Changes" on the MTA is set to "All". The extended messages are the only messages to contain remote node (**\$R**) and telephone number (**\$E**) information.

Note that only text messages starting with a number will be processed.



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### 6.25 Macros

Agent Manager Commands can use macros. These start with a \$, and must be defined before they are used. Wherever they occur in non-quoted text, the replacement value is inserted prior to any further processing. For example:

```
$mf = peristat x1xxxxxxxxxxxxxx
```

```
$msg = "Message"
```

Then this line:

```
if $mf then page 1234567 $msg
```

will be converted to

```
if peristat x1xxxxxxxxxxxxxx then page 1234567 "Message"
```

A few rules:

Macro substitutions are done on a line by line basis prior to the main parsing of the configuration.

Macro names can be up to 10 characters.

Macros are not recursive; once a replacement has been done, no further replacements of the replaced text will be done.

Macros will not be replaced in quoted text, but can contain quoted text strings.

Only a single definition (the first) of a macro is permitted.

If a macro substitution would make a line too long, the entire line is rejected and a warning displayed.

A space or new line must follow each macro name.

### 6.26 Debugging

By virtue of it's sheer complexity, debugging Agent Manager configurations can be a significant challenge.

If the Router Message Display parameter is sent to **Debug**, then a summary of each line parsed will be shown on the main log screen for every command that the Agent Manager processes.

This displays each parsed element **<like\_this>** followed by the internal parse state. Message decode states and comparison results are also shown **[like\_this]**. Failed compares are shown as **[!xxxx]** where xxxx is some possibly meaningful text describing the comparison type.

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### 6.27 Agent Manager Examples

Typical examples only – not exhaustive

#### 6.27.1 Router, Agent Manager Examples:

\$Console = 099:0003:50

If Event Mains\_Fail Then

    Activate \$Console 0

    Play "MainsFI"

End

If Event Mains\_OK Then

    Deactivate \$Console 0

    Play "MainsRs"

End

If Event Battery\_Low Then Activate \$Console 1 End

If Event Battery\_OK Then Deactivate \$Console 1 End

If Event System\_Fault Then Activate \$Console 7 End

If Event System\_OK Then Deactivate \$Console 7 End

#### 6.27.2 Printer Agent, Agent Manager Examples:

If Event Admin Then Play "@PA" End

If Event Mobilise:\* Then Play "@PM\$\$" End

If Event CallSign:\* Then Play "@C\$\$" End

If Event Repeat:\* Then Play "@PR\$\$" End

If Event RepeatCall:\* Then Play "@C\$\$" End

If Event Finish:\* Then Play "@PF\$\$" End

If Event NoPower Then Play "@S03" End

If Event NoPaper Then Play "@S03" End

If Event OffLine Then Play "@S03" End

If Event Error Then Play "@S03" End

If Event PaperLow Then Play "@S03" End

#### 6.27.3 Console Agent, Agent Manager Examples:

If Event Command:0 Then Page FA "" End

If Event Command:1 Then Page FB "" End

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If Event Command:2 Then Page FC "" End

If Event Command:3 Then Page TA "" End

If Event Command:4 Then Page TB "" End

If Event Command:5 Then Page TC "" End

### 6.27.4 Network Manager, Agent Manager Examples:

If Source 099:0099:01 And MTASat 3 Then

Display "4 Call IT Support Paging System Failure"

Play "Atten"

End

If Source 099:0099:01 And MTASat 1 Then

Display "7 Paging System LAN Now Connected"

Send ITSupport "Paging System LAN Now Connected"

End

If Source 099:0099:02 And TextMesg "Fire" Then

Display "1 FIRE ALARM MESSAGE - \$M"

Play "Atten,FireAl"

Send FireTeam "\$M"

End

If Source 099:0099:02 And TextMesg Then

Display "4 ALARM MESSAGE - \$M"

Play "Atten"

Send Estates "\$M"

End

If TextMesg "INP # On" Then

Display "1 Closing Contact \$\$ Activated"

Play "Atten"

Send Estates "Closing Contact \$\$ Activated"

End

If TextMesg "INP # Regen" Then

Display "4 Closing Contact \$\$ Repeat Alarm"

Play "Atten"

Send Estates "Closing Contact \$\$ Repeat Alarm"

End

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```
If TextMesg "INP # Off" Then
    Display "7 Closing Contact $$ Deactivated"
    Send Estates "Closing Contact $$ Alarm Cleared"
End

If AlrtStat xa Then
    Display "1 $N Low Forward Power TxA $D"
    Play "V$U,TxFail"
End

If AlrtStat xb Then
    Display "1$N Low High VSWR TxA $D"
    Play "V$U,TxFail"
End

If AlrtStat xc Then
    Display "1 $N Over Temperature TxA $D"
    Play "V$U,TxFail"
End

If AlrtStat xd Then
    Display "1 $N TxA Alarm 4 $D"
    Play "V$U,TxFail"
End

If AlrtStat xe Then
    Display "1 $N Low Forward Power TxB $D"
    Play "V$U,TxFail"
End

If AlrtStat xf Then
    Display "1 $N Low High VSWR TxB $D"
    Play "V$U,TxFail"
End

If AlrtStat xg Then
    Display "1 $N Over Temperature TxB $D"
    Play "V$U,TxFail"
End
```

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```
If AlrtStat xh Then
    Display "1 $N TxB Alarm 4 $D"
    Play "V$U,TxFail"
End
If AlrtStat xz Then
    Display "1 $N Total Failure Both Transmitter $D"
    Play "V$U,TxFail"
End
If AlrtStat 1a Then
    Display "1 $N Locked to TxA $D"
End
If AlrtStat 1b Then
    Display "1 $N Locked to TxB $D"
End
```

### 6.28 Agent Types

The following agent types can be specified:

- ISDN  
Provides a dial up link via an ISDN Terminal Adaptor
- PSTN  
Provides a dial up link via an PSTN Modem
- Private Wire  
Provides a permanent connection using a leased line modem or direct serial connection
- Printer  
Provides a connection to a printer
- Alerter Type 1  
Provides a connection to a MG4 Alerter System
- Alerter Type 2  
Provides full alerting/paging facilities
- Paging  
Provide wide area and system paging
- Peripheral  
Interface to Bells, Lights etc
- WAN  
Provides a "connect on demand" connection to another GD-92 node via an IP LAN
- LAN  
Provides a permanent connection to another GD-92 node via an IP LAN

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- **Asynchronous**  
Provides a permanent connection using a "3-Wire" serial link
- **Network Manager**  
Provides facilities for processing and analysing network wide events
- **UDP**  
A UDP MTA provides a connection to one or more remote systems using UDP datagram's on an IP network
- **Mobilise**  
A Mobilise Agent allows an external system, often the Multitone MFU software, to connect into a GD-92 system.
- **Tetra**  
Provides a connection to another GD-92 node via a Tetra radio network
- **Mobitex MTA**  
The Mobitex MTA provides a data bearer using the Mobitex (RAM) digital radio system. Maxon 'Packet AT' modems can be directly connected; other Mobitex modems and Kilo-stream bearers require an external interface such as AirPack.
- **Radio B**  
Provides a very deterministic protocol than some radio systems, and has more limitations. But, it is much faster than other systems.
- **Radio\_C**  
Provides a connection to another GD-92 node via a RMIP2 packet radio network
- **Paknet**  
Provides a connection to another GD-92 node via a Paknet radio network
- **Virtual**  
Provides a virtual connection between a GD-92 node and a serial interface
- **Alarm**  
Provides an interface from external alarm systems into a GD-92 system
- **Sound**  
Provides facilities to play sounds
- **Scroll-board**  
Provides a connection to a scroll-board (LED Display Board)
- **Console**  
The Console Agent allows a UFI (Front Panel) to appear to a system as a Peripheral Agent.
- **Remote Console**  
The Remote Console Agent allows a traditional serial Remote Console from legacy systems to be used in much the same way as a normal front panel Console.
- **Display**  
A Display Agent provides an interface to a screen display, normally using MFWS to provide the actual display. Operationally, this agent acts like a standard GD-92 Printer Agent.
- **Button Box**  
The Button Box Agent acts like a normal peripheral agent, except that the first five LOGICAL channels have special processing to emulate the keys used on a traditional MG4 Firecoder.

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- **Paging Input**  
The Paging Input Agent accepts messages from a variety of different external paging systems and translates the paging messages into <page\_officer> messages.
- **MG4 Emulation**  
This agent allows the system to emulate a MG4 Alerter. A separate GD-92 Alerter Agent is used to actually transmit the MG4 commands.
- **Email**  
Future Agent. Provides an interface between GD-92 and Email.
- **Unassigned**  
Any unassigned agents will be removed when the system is next restarted.

### 6.29 Port Number

Each user agent at a node has a different GD-92 port number, which is the final part of the system wide address used to communicate with an agent. The router is always set to port 0. Other agents can be set in the range 1 to 63.

In order to use the Multitone standby alerter system, each user agent in a brigade must be set to the same port, e.g. all alerters will be port 30. Multitone engineering programs automatically read the port number for a user agent; other systems will need to be reprogrammed if the port number is changed.

### 6.30 Notify Status Changes

If this parameter is set to **Yes**, any changes in MTA status will cause a message to be sent to the network manager with the new status.

Some dialup MTA's have an **Extended Status** parameter. If this is enabled, extended GD-92 status messages are sent with changes in dial-up states. Note that as these messages contain additional information, they are not guaranteed to be compatible with all GD-92 systems, though all Multitone GD-92 systems will correctly process them.

### 6.31 Minimum Priority

Each message type can be sent with a priority between 1 and 9, with priority 1 being the highest priority.

Each MTA will only transmit messages with a priority equal to or higher (**numerically lower**) than the value specified in this parameter.

If an upper digit is specified, this specifies an additional "test" priority for the MTA. Messages with a priority EQUAL to this value will also be transmitted.

### 6.32 Connected To

This parameter specifies the current node that the MTA is connected to. For fixed MTA's (Private Wire, Async etc) this will be programmed into the non-volatile table.

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For dial-up MTA's, this parameter will be a dynamic parameter stored in the current table indicating the current node that the MTA is connected to.

### 6.33 Frame Duration & Timeout

Frame Duration specifies the maximum time allowed for receiving a single frame. If it is set too low, very long frames could timeout before being fully received.

Frame Timeout specifies the maximum time that an MTA should wait for an acknowledgement before re-transmitting the frame. Again, if this is set too low, there may be insufficient time for the frame to be sent and the acknowledgement returned.

Both times are specified in seconds.

### 6.34 Device Name

This parameter specifies the communication path for the device used by the agent. Many options are possible for this parameter, some of the main ones are:

- Simple COM port, e.g. **COM1**  
For a real serial port, this defaults to 9600 baud, 8 data bits, no parity and 1 stop bit. This format should always be used for UPI and UFI devices.
- Advanced COM port, e.g. **COM2:19200,7E1**  
This syntax allows the **baud** rate, **7** or **8** data bits, **No**, **Even** or **Odd** parity and **1** or **2** stop bits to be specified.
- COM port with no flow control, e.g. **COM2,NOFLOW**  
Normally, the RTS and CTS serial port lines provide flow control between devices. For some simple applications, these may not be available and this format allows these lines to be ignored. Note that with some protocols, data overrun may occur if no flow control is available, so this format should only be used when absolutely necessary.
- Connection to an network address and port, e.g. **192.168.1.1:6001**  
In this mode, a serial port is emulated using the network connection; for instance, a **connection** to a remote system will only be attempted if DTR is asserted locally, and DCD will be asserted while connected. If the connection is lost, it will be automatically retried.
- Listening on an network port, e.g. **LISTEN:6004** or **0.0.0.0:6005**  
In this mode, a serial port is emulated using the network connection; in this case, the agent will **listen** for an incoming connection on the port specified. Again, the connection will only be accepted if DTR is asserted locally, and DCD will be asserted while connected. If the connection is lost, the port will automatically listen for a new connection.
- Connection to local network port, e.g. **LOOPBACK:6002** or **LOCAL:6003**  
In this mode, a serial port is emulated using a network connection to the **local** machine; for instance, a connection to the specified port will only be attempted if DTR is asserted locally, and DCD will be asserted while connected. If the connection is lost, it will be automatically retried.
- Parallel Port **LPT1,PRINTER**  
This is only used with a Printer Agent, but is not recommended as it rarely works properly with most systems.



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- System printer **LaserJet 5L,PRINTER**  
This is only used with a Printer Agent, and uses the printer specified. Note that Windows printers do not give the fine granularity of control normally expected from a GD-92 system; better to use a printer attached via an RPI
- A Device Name of **EMULATE** can also be used to emulate a printer or UPIP device. The printer emulation swallows data at a rate of several hundred characters per second; the UPIP emulation provides enough UPIP responses to make most simple UPIP based agents appear to function

Note that UPI and UFI devices are installed as COM ports on the system; the COM port numbers for these tend to be sequentially assigned, but can be changed to more memorable values (normally COM10 upwards) using **Device Manager** in the **Control Panel**. These devices ignore any baud rate settings.

Default UPI/UFI settings are:

- COM10 Console Agent (UFI)
- COM11 Peripheral Agent 1 (UPI)
- COM12 Peripheral Agent 2 (UPI)
- COM13 Peripheral Agent 3 (UPI)
- COM14 Alerter\_2 Agent (UPI)

### 6.35 Alerter Directory and Formats

The Alerter Directory provides basic lookup and formatting for calls sent via the alerter. This can have up to 65535 entries, but would normally only be used for team and specific calls as the Paging agent would normally be used for call translation.

Only calls that match entries in the alerter directory will be processed, though a wildcard entry can be included.

Each alerter has its own alerter directory.

Each entry has four fields:

- **User**  
The User can be any sensible alphanumeric combination, e.g. 1234, Fred, TA Any matches are case insensitive
- **Address**  
This contains the numeric pager address. For Pocsag systems, this is a number between 8 and 2097151. For Mk7, this is 0 to 9999, however, group pages are supported using the formats 123\*, 12\*\*, 1\*\*\* and \*\*\*\* for deca, hecto, kilo and all call groups. The address is ignored for a wildcard entry.
- **Format**  
This field of the directory allows a variety of different page formats. Multiple format codes may be specified.
- 1..4 Pocsag Function Codes

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- 5..8 Pocsag Function Codes 1..4 with numeric message formatting
- 1..9 Mk7 Beep Codes
- P Pocsag Format (default)
- M Mk7 Format
- S Speech (Mk7 Only, future facility)
- N Numeric Message Format (Pocsag Only)
- A Alpha Message Format (default)
- R Repeat Call
- D Double Repeat Call
- T Triple Repeat Call
- Q Quad Repeat Call
- O Overlapped Pocsag Call Repeat
- F Auto-Retry if Fail (Dual TX Pocsag Only)
- V Verify Page
  
- **Message**  
This field provides a default message for use when no other message is supplied (normally team/engineering/coverage calls).

### 6.36 Verification

Off-Air verification can be enabled on one or more call types by including the appropriate flag in the format field. If verification is enabled, something will need to tell the encoder that the call has been sent correctly. This can be any of the following:

- 6.36.1 An Internal Receiver Decoder (Decoder Mode must be enabled)
- 6.36.2 An External Receiver connected via an Alarm Agent with the alarm message directed to the Alerter.
- 6.36.3 A Closing Contact Pager connected to a Peripheral Agent

For the Closing Contact Pager, the Agent Manager on the Peripheral Agent must be configured to send a text message to the encoder with the message "**addr**" where addr is the pager address (RIC) of the pager. If the pager is capable of decoding multiple addresses, send a text message for EACH address. Unlimited Closing Contact Pagers may use this method.

### 6.37 Normal Calls

The alerter will accept one or more users, separated by comma. Each user may be numeric or alphanumeric. However, only numeric calls can use the wildcard facility. If multiple calls are specified and any one is not matched, NO calls are sent.

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### 6.38 Team Calls

A MG4 team call will page all calls in the directory matching the team name. Each call can have a single RIC, a specific format and an optional message.

Fire Calls use user names **FA,FB,FC** etc.

Test Calls use user names **TA,TB,TC** etc.

A team call can also be sent as a Page Officer message with a ric of FA, FB etc. In this case, if no message is supplied, the default message from the directory will be used.

### 6.39 Coverage Test

This will use all calls in the directory with a user name of **EN** (Engineer). This entry is also used for the GD-92 "Page Engineer" command.

### 6.40 Wildcard

If one or matches are found in the directory, pages to this address are done. If not, and there is a wildcard entry in the directory (user "\*\*") AND the incoming page address is numeric, then a direct call will be made to that user.

### 6.41 Page\_Officer Calls

Separate parameters allow configuration of the format default for each type of Page Officer alerts. These allow the same formats as the alerter directory.

### 6.42 Repeats

Call and overlap repeats will only be sent if the appropriate Repeat Times are configured.

### 6.43 Pager Formatting

The format of any page is a concatenation of the following:

- 6.43.1 Format from page\_officer format (if relevant)
- 6.43.2 Alpha (**A**) or Numeric (**N**) specification from page\_officer message
- 6.43.3 Format from directory entry

So if the directory entry specified numeric format and the page\_officer message specified alpha, the message would be sent with numeric format.

### 6.44 Transmitter Modes

These options select the transmitter mode used.

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### 6.45 1200 Baud Paging

Normally, all paging is done at 512 baud, however, for special applications, 1200 baud may be used to increase throughput at the expense of coverage. If this parameter is true, 1200 baud is used for all calls, both Mk7 and Pocsag format.

### 6.48 Manchester Encoding

Normally, all paging calls use NRZ format, however for special applications (normally only older Mk7 systems running at 512 baud), Manchester Encoding will be used for 512 baud Mk7 format calls if this parameter is true.

### 6.49 Inversion Control

The polarity of the various signals used to drive a transmitter and receiver are preset for the most common configuration. However, individual control of each signal can be enabled as required.

Control Line	Value (hex)	Default
Data Output	0001	Active-Low
Transmitter A Key	0002	Active-Low
Transmitter B Key	0004	Active-Low
Voice Mode Key	0008	Active-Low
Transmitter Alarms	0010	Active-Low
Carrier Detect	0100	Active-Low

The value of this parameter is the hexadecimal sum of each control line that needs inversion.

The **Data Output** is normally **High** to select the higher frequency and **Low** to select the lower frequency for a paging transmission. POCSAG transmissions are normally sent with inverted data; however, this inversion is automatically taken care of by the alerter and should not be specifically included in the **Data Output** setting.

The **Voice Mode Key** is only used for speech paging, and selects digital or analogue mode on a transmitter. The output is active when the transmitter is required to transmit analogue (voice) signals.

When using a **PSL Transmitter**, the only control line that should be inverted is **Transmitter Alarms**, so this parameter should be set to **0010**.

Note that if **Decode Mode** is enabled, the transmitter will be inhibited whenever the **Carrier Detect** input is active. However, if nothing is connected to this input, it will read as high, therefore it will always be inactive with the default **Carrier Detect** polarity settings.

### 6.50 Wide Area Table

This table is used to specify the name, addresses and zones for all the hilltop sites used for a Wide Area paging scheme. Leave any unused entries set to 000:0000:00

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Each hilltop should be set to a radio zone (1..4). All transmitters in the same zone will be activated together. Setting a zone to 0 will disable that hilltop.

In acknowledged page mode, the timeout field specifies the maximum time to wait for a response from each hilltop. Depending on bearers, it should normally be set to 20 seconds, but may need to be longer if slow bearers are used or if very high paging traffic is expected. When all the pages are complete for a zone, the wide area agent will go onto the next zone without waiting for the timeout time. The minimum timeout value is 5 seconds.

In unacknowledged page mode, the zonetime is automatically estimated from the number and length of pages sent. This field can be used to specify ADDITIONAL time to account for slow bearers or other traffic on the transmitters. The minimum zonetime is 3 seconds.

Note that each page may be only be sent to a maximum of 63 hilltops in each zone.

### 6.51 Selective Paging

Normally, all paging requests to a Paging Agent will be sent to every node listed in the Wide Area table. However, in some situations, it can be beneficial to only use particular hilltops for particular pager addresses.

To use a hilltop only for certain page addresses, specify the addresses (or more typically, the range of addresses) in the **Selective Paging** column in the Wide Area table for that hilltop. Multiple specifications can be included, each separated by a comma.

Each entry is in one of these forms:

- A specific RIC code, e.g. 1234567
- A RIC code range, e.g. 1000000-1999999
- A wildcard match, e.g. 123\* will match any address STARTING with 123 (123,1234,1234567 etc).
- A character wildcard match, e.g. ???123 will match any seven digit address ENDING in 123.

Examples:

1234567  
1000000-1000030  
????345  
103\*  
1000,2000,3000,4000-4999

### 6.52 System and User Directories

The System and User Directories provides address translation for <page\_officer> calls sent to a Paging Agent.

Each Paging Agent has its own User and System Directory.

The Non-Volatile table is used for all lookups, allowing 'live' updates of the tables without the need to reset the system.

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For each entry in an incoming call, the System Directory is searched first and any address match in the **User** column is translated to the value in the **Address** column. This process is then repeated using the User Directory.

At each stage, multiple destinations (comma separated) are expanded and subsequently processed as individual entries.

The directories may be used to translate both alpha and numeric page addresses.

Once any input has been translated, each destination is processed as follows:

- Destinations containing @ are treated as emails and sent to the default mail agent.
- Destinations starting with + are considered to be SMS calls, and sent to the default gateway agent.
- Destinations starting with \$ are treated as **System Pages**:
  - \$SND=xxx plays sound **xxx** on the default sound agent
  - \$SET=n sets output **n** (1..16) on the default peripheral agent.
  - \$CLR=n resets output **n** (1..16) on the default peripheral agent.
  - \$POP pops up the message on the default mobilise agent.
  - \$SCR sends the message to the default scroll-board agent.
  - \$PRN prints the message on the default printer.
- Numeric and two letter alpha calls are treated as page calls, and sent to the destinations listed in the Wide Area table.

Each table entry has four fields:

- **User**  
The User can be any sensible alphanumeric combination, e.g. 1234, Fred, TA All comparisons ignore the case of any letters.
- **Address**  
This contains the destination address or a list of addresses separated with commas.
- **Format**  
This field is currently unused, however some external databases will ignore entries with an **X** in this field.
- **Message**  
This field is currently unused.

### 6.53 Transmitter Selection

For some applications, it is necessary to modify the transmitters used for a specific call. This is done by adding transmitter selection commands to the destination for that call.

- If a destination is **\*transmitter**, then any errors from that transmitter will be ignored. If an error does occur, a warning message will be shown in the main log, but the original call to the Paging Agent won't be failed for this reason.
- If a destination is **-transmitter**, then that transmitter will not be used for this call. Note that

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Transmitter Selection is done whilst the System and User directories are being parsed. In the case of calls that expand to multiple destinations, each new destination will add to the transmitter list based on the Selective Paging selection, potentially reinstating a previously removed transmitter.

- If a destination is **+transmitter**, then that transmitter will be added to the transmitters used for this call.

### 6.54 GD-92 Implementation Notes

These notes define all significant variations between the GD92 Protocol Specification, Issue 2.2 and the current Multitone implementation of this specification.

#### 6.54.1 Router

To enable reliable communication with the unit using 'unknown' remote node addresses, the router will initially attempt to send a response message back via the same MTA that received the message. If this fails, or the MTA is offline, the normal router table is used. This also avoids the problem of a response message coming back via a different MTA if that had a higher preference.

The size of some tables (Router, PSTN etc) has been adjusted on some systems from the standard 200 entries to reflect the likely maximum for each system. The maximum number of destination ranges for <dest\_nodes> is one in all cases.

To ease system set-up and testing, if no password is stored in the level 4 password (the 'contractors' level), the password control system is automatically disabled.

The alerter UA will drive an external MG4 alerter if the agent type is set to Alerter Type 1, and the internal MG4 compatible alerter if it is set to Alerter Type 2.

#### 6.54.2 Message 02: Mobilise Message

Often, a brigade will have a requirement to define it's own format of mobilise message format. Message 27 can be used, but loses the priority and repeat print facilities. To accommodate "user defined" messages, if any of the standard mobilise message fields are left blank, they and their header will NOT be printed, allowing a free format mobilise message to be sent in the <text> field. If more than one text field is required, the second <mobilisation\_type> field can be set to an illegal value, which will inhibit any other printing between successive <text> fields.

#### 6.54.3 Message 09: Peripheral\_status\_request

This message will normally return the current "real-time" status of the peripheral user agent. For some applications, a "latched" status is required. These are accessed by including an additional byte with the message set as follows:

- 0 - Same as format
- 1 - Return LATCHED input status
- 2 - Return LATCHED input status and reset latches.

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### 6.54.4 Message 27: Text\_Message

For test purposes, if this message is sent to any Multitone Router (port 0), the router will send the message back to the source.

### 6.54.5 Message 42: Alert\_Crew

The following additional <alert\_group> functions are available:

- "FH".. "FJ" - User defined fire call
- "TH".. "TJ" - User defined test call
- "PN" - Page Engineer
- "P0".. "P9" - Page user entry 0..9

### 6.54.6 Message 43: Alerter\_Engineering

The following additional <alerter\_engineering> functions are available:

- 'F' - Transmit Pocsag zeros
- 'G' - Transmit Pocsag ones
- 'H' - Transmit Pocsag zeros & ones
- 'R' - Enable out-of-range transmissions
- 'S' - Disable out-of-range transmissions

### 6.54.7 Message 66 - MTA Status Change

This message provides adequate status for MTA failures, but does not cover errors arising from "transient" events on dial-up MTA's, such as Engaged Lines and No Answer conditions. Multitone dial-up MTA's can optionally be configured to send extended MTA\_status\_change messages on dial-up fails with the following format:

<extended\_MTA\_status><comms\_address><tel\_number>

where <extended\_MTA\_status> codes are:

- 0..3 - As GD-92
- 4 - Modem Error
- 5 - Line Busy/Engaged
- 6 - No Carrier
- 7 - No Answer
- 8 - No Dial-tone
- 9 - No Logon (Modem answers but no ACK from remote)

<comms\_address> is the node that the MTA was dialling. <tel\_number> is the telephone number it was using.



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### 6.54.8 Message 220: Play\_Sound

This message is only used with a Sound Agent, and will trigger the agent to play the sound or sounds specified. An ACK message is returned immediately. The sounds are played in the order they are specified.

Format:

(<string>) Up to 8 alphanumeric characters per sound.

### 6.54.9 Daylight Saving Time

In order for the station to control outside lights and other peripherals based on clock time correctly, the station needs to know if the current station time is GMT or if Daylight Saving Time is in effect. The ES-Firecoder uses information from the host operating system, therefore it is important that this is correctly set.

An extra character on the end of Router parameter 20 (time\_and\_date) achieves this. This is set to an ascii "0" if no Daylight Saving Time is in effect or "1" if it is. If this extra character is not supplied (i.e. a "standard" message is received) this parameter is not changed.

## 6.55 ISDN Terminal Adaptor Notes

For ISDN use GD92 parameters should generally be set as follows:

"Frame Duration" - 3 seconds  
"Frame Timeout" - 3 seconds  
"Max dial-up time" - 10 seconds  
"Modem Init String" - "ATS0=1"  
"Modem Dial String" - "ATD"

The "Modem Dial Suffix" can be useful to include ISDN subaddressing without putting the subaddress commands into the PSTN/My Phone tables.

The MTA "Modem Init String" should be set to "ATS0=0" for no auto answer, or "ATS0=1" for auto answer.

## 6.56 Hayes Accura External ISDN Terminal Adapters

These units are shipped with PPP as their default protocol, and need configuring for V.120 protocol.

The following set-up should be used for these TA's:

AT&F1 (Reset to factory default)  
AT%A2=2 (V.120 protocol)  
AT%C0 (Don't display caller ID)  
AT&W (Write parameter changes)

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For PC use, it is recommended to set the Modem Timing Speed parameter to 22, and to run the PC->TA serial port at 57600 baud.

### 6.57 Thorcomm Modems

These are RLC-220 modems with Thorcomm RMIP2 software V2.43 or later, set-up to communicate with the nodes using a standard RS232 serial port, normally set to 9600 baud 8 bit, No parity, 1 stop bit. CTS/RTS handshaking is used to handshake the data.

The packet modems can be configured for many different operating modes. This must be initially done using the Thorcomm supplied program 'PROG' (great naming!).

The 'PROG' program requires another Thorcomm program 'THORIO.COM' to be run before it. This stays loaded in memory, and the combination of the two is known to be prone to crash if any other comms software is run after it. It will also not run properly on a modern fast PC (most Pentium class or later) so keep hold of an old PC on which to run it!

When programming the modems, they should be set to a call-sign of zero as the actual 'My Call' value is automatically set by the Firecomms software to the current node number. This allows all modems for a particular scheme to be programmed with the same set-up, allowing easy interchange.

When using a MDS700 gateway system, it may be possible to remotely program the modems using this software.

### 6.58 LAN/WAN Connections

All Multitone Windows based software supports connections to remote devices over a network running a TCP/IP protocol stack. Depending on the network configuration, this will normally use the "LAN" or "WAN" MTA types, but a comm. port can also be redirected over the network to a remote terminal server for specific applications.

#### 6.58.1 LAN MTA

Each LAN MTA allows a single permanent connection to be made to another LAN or WAN MTA (Multitone or others), or to a LanModem interface. The IP and GD-92 addresses are hard coded in the MTA parameters. The LAN MTA can also be configured to accept incoming connections.

The "Connected To" parameter must contain the GD-92 node address of the remote node.

If the MTA can "listen" for incoming connections, the port number to listen on must be set in the "Listen Port" parameter. This defaults to the MTA number (1..n) + 6000.

If the MTA should attempt to connect to a remote node, the IP address and port of the remote node should be set in the "Remote Address" parameter.

#### 6.58.2 WAN MTA

Each WAN MTA allows a single "dial-up" connection to be made to another LAN MTA (Multitone or others), or directly to a Lantronix Server. The LAN Table allows mapping of GD-92 nodes to IP addresses.

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If the MTA can "listen" for incoming connections, the port number to listen on must be set in the "Listen Port" parameter. This defaults to the MTA number (1..n) + 6000.

The WAN table will provide a list of remote nodes and corresponding IP addresses and port numbers. This operates in much the same way as a standard dial up modem.

The "Connected To" parameter will contain the GD-92 node address of the currently connected remote node.

### 6.58.3 Redirected Comm Port Connections

A redirected comm. port is usually addressed to connect to a remote Lantronix server or a Firecoder/Access-1200 LAN interface. These connections are redirected from standard COM ports, so can normally be used for any MTA type, though would normally only be used with the Private Wire MTA.

The emulated DTR line is used to make/break the connection. The emulated DCD line is asserted when the connection is made. This means that only MTA types that monitor these lines should be used with TCP LAN connections, which normally excludes Asynch MTA's.

Only numerical network addresses are permitted. This is to speed up connection times and reduce dependencies on name servers.

### 6.59 Peripheral Output Word

The hex value for a peripheral output command is the SUM of the following hex values:

Station Sounders	8000	Station Doors	0400
Station Lights	4000	Standby Sounder	0200
Spare Output 2	2000	Appliance Indicator 1	0080
Spare Output 3	1000		
Spare Output 4	0800	Appliance Indicator 8	0001

For example, to set the Sounders, Lights and Doors, the value should be set to  $8000+4000+0400 = C400$ .

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### 6.60 PSL630 – UPI Wiring Connections

PSL 630 Mains-Fail (Link: PL1 PIN8 (Alarm Board) to Pin3 DC OUT SK3)

PSL630 Pin	Function	UPI Pin
1	Ground	5
5	Data	24
6	Alarm2	19
7	Alarm1	6
8	Alarm3	7
9	Key	1
10	Alarm4	20

### 6.61 Remote Printer Interface (RPI)

The normal maximum distance a parallel printer can be located from a Firecoder is between two and three metres.

In applications where the printer must be located more than the recommended distance away from the Firecoder, the RPI offers a better solution than commercially available printer drivers.

Instead of connecting to the parallel printer port, the RPI connects to a spare serial port, with the parallel printer being connected to the RPI. The Comm Port parameter in the printer agent must be set to match the serial port to which the RPI is connected.

The printer agent will automatically detect when a RPI is being used, so its operation will be transparent to the system.

The RPI unlike commercially available printer drivers retains all the fault and status reporting of the parallel printer port, as well as having an additional low paper input for a OKI Micro-line 280 paper roll feeder.

Status LED: The status LED on the RPI blinks each time a status character is sent to the Firecoder. This is automatically every 500mS but additional statuses (and hence flashes) may be requested. Additionally, the presence of any data in the 512 character internal buffer of the RPI holds the LED "on".

The Remote Printer Interface uses the following status codes in the history log.

Remote Printer Interface Status	
Code	Status
A	RPI Active
D	RPI Disconnected

The Serial Port on the RPI has an 8 Pin RJ-45 socket with the following connections.

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RPI Data Cable			
RPI Sk1		Firecoder	
Pin No.	Function	Pin No.	Function
1	TxD	2	RxD
2	RTS	8	CTS
3	RxD	3	TxD
4	CTS	7	RTS
5	GND	5	GND

### 6.62 Parallel Printer Interfaces

A selection of Parallel Printer Interfaces are available. Each, are designed to allow a PC to be easily interfaced to a parallel printer whilst retaining the 'intimate' control of the printer that is not available when using the interface provided by the Operating System. In addition, the serially connected devices allow the printer to be located a substantial distance away from the Firecoder.

The following interfaces are available; in each case, they appear to the PC as a standard COM port and will be automatically be detected by a Printer Agent:

- UPR USB Printer Interface
- SPR Serial Printer Interface (Future Product)
- RPI Serial Remote Printer Interface (Legacy Product)

### 6.63 UPR Printer Interface

The UPR requires a set of PC drivers for operation. These are standard drivers, and can be downloaded from the FTDI web site at <http://www.ftdichip.com/Drivers/VCP.htm> or can be loaded directly using the Windows Online update facility. Only a single set of drivers need be installed no matter how many Multitone USB peripherals (even different types) are connected.

A UPR may be physically mounted inside an ES-Firecoder, or connected up to 5m away using standard USB leads. Longer distances are also possible when using a USB Repeater.

No facilities for Paper Low are provided by the UPR; if these are required, use a separate connection to a Peripheral Agent.

### 6.64 SPR Printer Interface

The SPR connects to any available serial port (or a USB->Serial adaptor). No facilities for Paper Low are provided by the interface; if this is required, use a separate connection to a Peripheral Agent. The interface requires a +12V to +24V power supply able to supply at least 50mA. The Serial Port on the SPR has an 8 Pin RJ-45 socket with the following connections:

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SPR Pin	Signal Name	D9F Conn	SPR Pin	Signal Name	D9F Conn
1	TXD	2	-	DSR	6
2	RTS	8	-	DTR	4
3	RXD	3	-	DCD	1
4	CTS	7	8	+12-24V	
5	GND	5			

Pins **6**, **4** and **1** should be linked on the D9F connector. If this is not possible, then '**DCDON,DSRON**' must be appended to the Device Name parameter otherwise the Printer Agent will not go online.

### 6.65 Routing

When routing a message externally, a list is built of all the valid routes in the router table, ordered by preference. For fixed agents (PWIRE, ASYNC etc), there is an entry per MTA, for dial agents (PSTN etc) there is an entry per dial up number.

Duplicate routes (with the same bearer type and preference) are removed.

This will give a list something like

1. PW MTA 1 (Pref. 1)
2. ISDN number 1 (Pref. 2)
3. ISDN number 2 (Pref. 2)
4. PSTN number 1 (Pref. 3)
5. PSTN number 2 (Pref. 3)
6. PSTN number 3 (Pref. 3)

Provided the preferences are different, it is possible to use a bearer twice. The phone numbers will be ordered to use "Available" numbers first. If the message is a reply, the highest preference "route" will be to send it back via the MTA the message came in on. This is handled automatically.

The initial route list for a message can be viewed by setting the "Message Logging" parameter in the NUA to "DEBUG"

When the message is being dispatched, this route list is used, starting with the first entry, and working down. For dial up MTA's, the MTA chosen is the 'first' that meets the following requirements:

1. Connected to node
2. MTA inactive and 'available'
3. MTA inactive and 'unavailable'
4. MTA connected to another node

The MTA 'available'/'unavailable' flags are set based on the last message that MTA sent. If it was sent OK, the MTA is considered 'Available', if not, 'Unavailable'. It's not really a good term to use to describe it though.

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For fixed agents, the route list is worked through "dumbly".

If a route fails, and more bearers are available, any other routes via the failing bearer are removed. So in the example above, if route 2 fails, route 3 would be removed. But if route 4 fails, routes 5 and 6 are still attempted.

The "Mobitex" bearer is a mixture of "fixed" and "dial-up" bearer. It acts like a PW bearer in the sense that the routes are MTA specific, but will have an entry for each matching number in the radio table. So if a node has two "Mobitex" numbers, a route list could be something like

1. LAN MTA30
2. Mobitex MTA1 number 1
3. Mobitex MTA2 number 1
4. Mobitex MTA1 number 2
5. Mobitex MTA2 number 2

Again, Mobitex numbers are chosen based on their "Available"/"Unavailable" status.

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### SECTION 7 - SPARES AND REPAIRS

#### WEEE DIRECTIVE & PRODUCT DISPOSAL

At the end of its serviceable life, this product should not be treated as household, or general waste. It should be handed over to the applicable collection point for the recycling of electrical and electronic equipment, or returned to Multitone or their agent, for disposal.



#### Multitone Repair Policy

It is the policy of Multitone Electronics PLC that repairs to our products should only be carried out by authorised repair facilities. Any attempted repair by a non-approved repair facility will invalidate any warranty and or statement of specification from Multitone Electronics PLC for the repaired item and the complete system of which the repaired item forms a part.

Authorised repair facilities may carry out the replacement of sub assemblies and other parts as specified in the technical manual. A complete list of authorised parts and assemblies is included in the relevant repair section of each technical manual.

A more detailed list of parts is available to Repair facilities who have completed the appropriate training and who have been authorised and certificated as Approved Multitone Repair facilities on specific products.



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### 7.1 The following spares are available from:

Multitone Electronics plc  
Project Co-ordination  
Hansa Road  
Hardwick Industrial Estate  
Kings Lynn  
Norfolk  
PE30 4HX  
England

Tel: +44 (0) 1553 760061  
Fax: +44 (0) 1553 765945

Email: [projectcoordination@multitone.com](mailto:projectcoordination@multitone.com)

## ESFIRECODER - Emergency Services Firecoder

Part Number	Description	ESFIRECODER	ESFIRECODER-1	ESFIRECODER-2
0201-1262	Rear Panel PCB Assy	x	✓	✓
0261-7748	Rear Panel PCB Assy	✓	x	x
0261-7751	Front Panel PCB Assy	✓	✓	✓
0301-1301	Case Back Assy ESFIRECODER	✓	x	x
0301-1302	LCD Module 2x24 Character Assembly	✓	✓	✓
0301-1303	Front Panel Assy ESFIRECODER	✓	✓	✓
0301-1396	Case Back Assy Firecodermk2	x	✓	✓
2325-0013	2.5" to 3.5" HDD Interface	✓	✓	✓
2325-0024	USB To Serial RS232 Adaptor	x	✓	✓
6007-0006	Voltage converter 24/12V	✓	✓	✓
6607-0002	ATX DC-DC Power Supply Module	✓	✓	✓
6701-0021	Mother Board EPIA-ML5000EA	✓	✓	✓
6704-0017	256MB Memory Module DDR226	✓	✓	✓
6706-0002	USB Hub 7 Port	✓	✓	✓
<b>If replacing this part and the old part was 6706-0003 USB Hub 4 Port the Front Panel PCB Assy must have Relay 6301-0007 and Suppress Diode 3703-0039 fitted. Note these are added to PCB at issue 2. 6706-0002 secured using Bracket 1061-8063</b>				
7718-0033	USB 0.75m Long	✓	✓	✓
7761-7969	Ribbon 10 way (60mm)	✓	x	x
7761-7970	Ribbon 10 way (115mm)	✓	x	x
7761-7971	Ribbon 10 way (125mm)	✓	x	x
7761-8258	Ribbon 10 way (180mm)	x	✓	✓
7761-8259	Ribbon 10 way (140mm) - 2 per	x	✓	✓
ESF-WXP-HDD	40GB Hard disk 2.5"	✓	✓	✓
UPR	USB Universal Printer I/F	x	✓	✓
USBPERI/FACE	USB Peripheral Interface	✓	✓	✓

## ESFIRECODER - Emergency Services Firecoder

---

### **WARNING**

Many resins and other chemicals used in the manufacture of electronic components fitted to this product give off toxic fumes when incinerated. Appropriate precautions should therefore be taken when disposing of these items. Always dispose in accordance with local authority requirements.

**7.2** For repair of this equipment in the first instance contact:

Multitone Electronics plc  
The Repair Centre  
Hansa Road  
Hardwick Industrial Estate  
Kings Lynn  
Norfolk  
PE30 4HX  
England

Tel: +44 (0) 1553 760061  
Fax: +44 (0) 1553 765945

Email: [repairs@multitone.com](mailto:repairs@multitone.com)

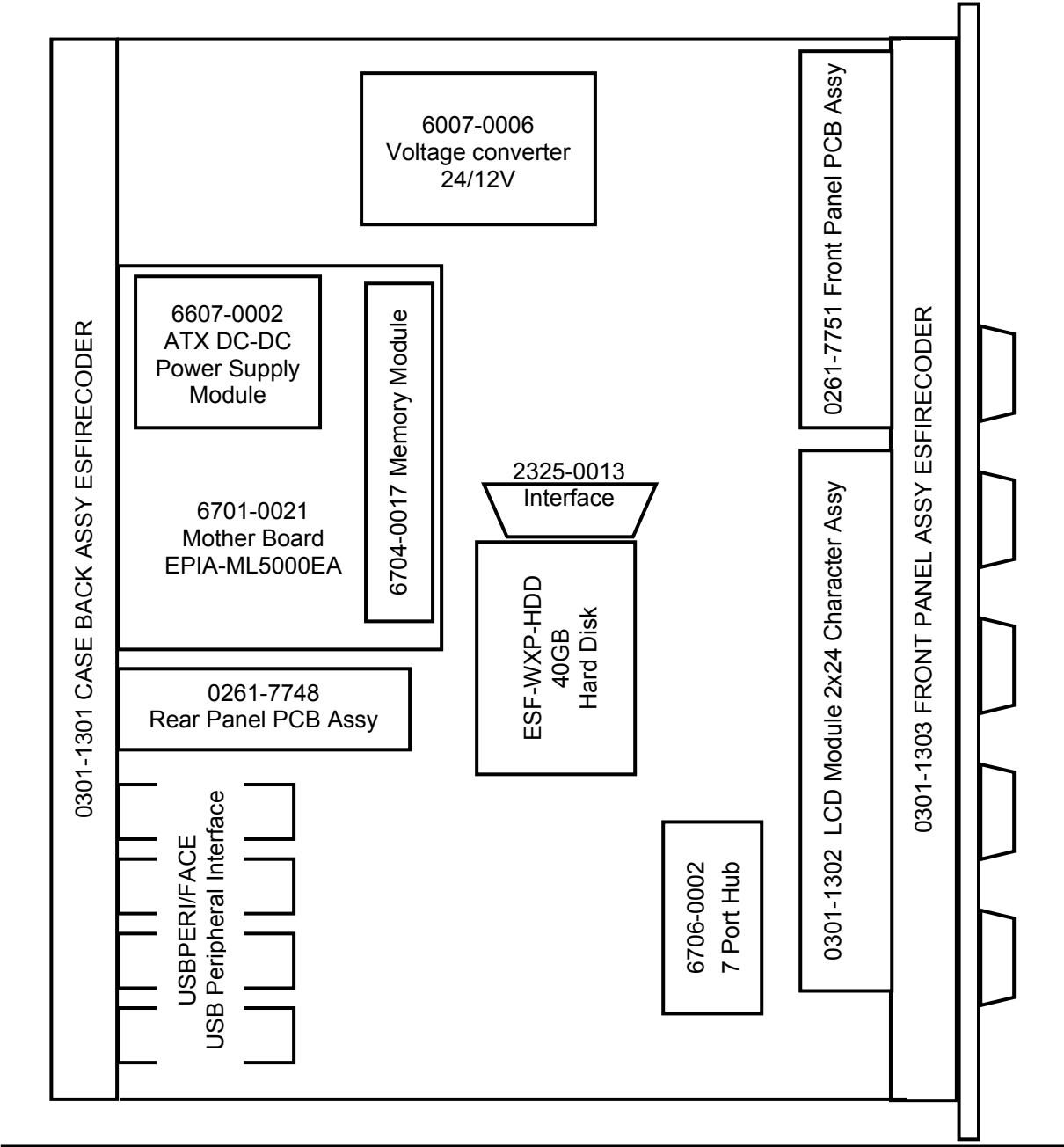
ESFIRECODER - Emergency Services Firecoder

SECTION 8 – Technical Assembly Details

**CAUTION**

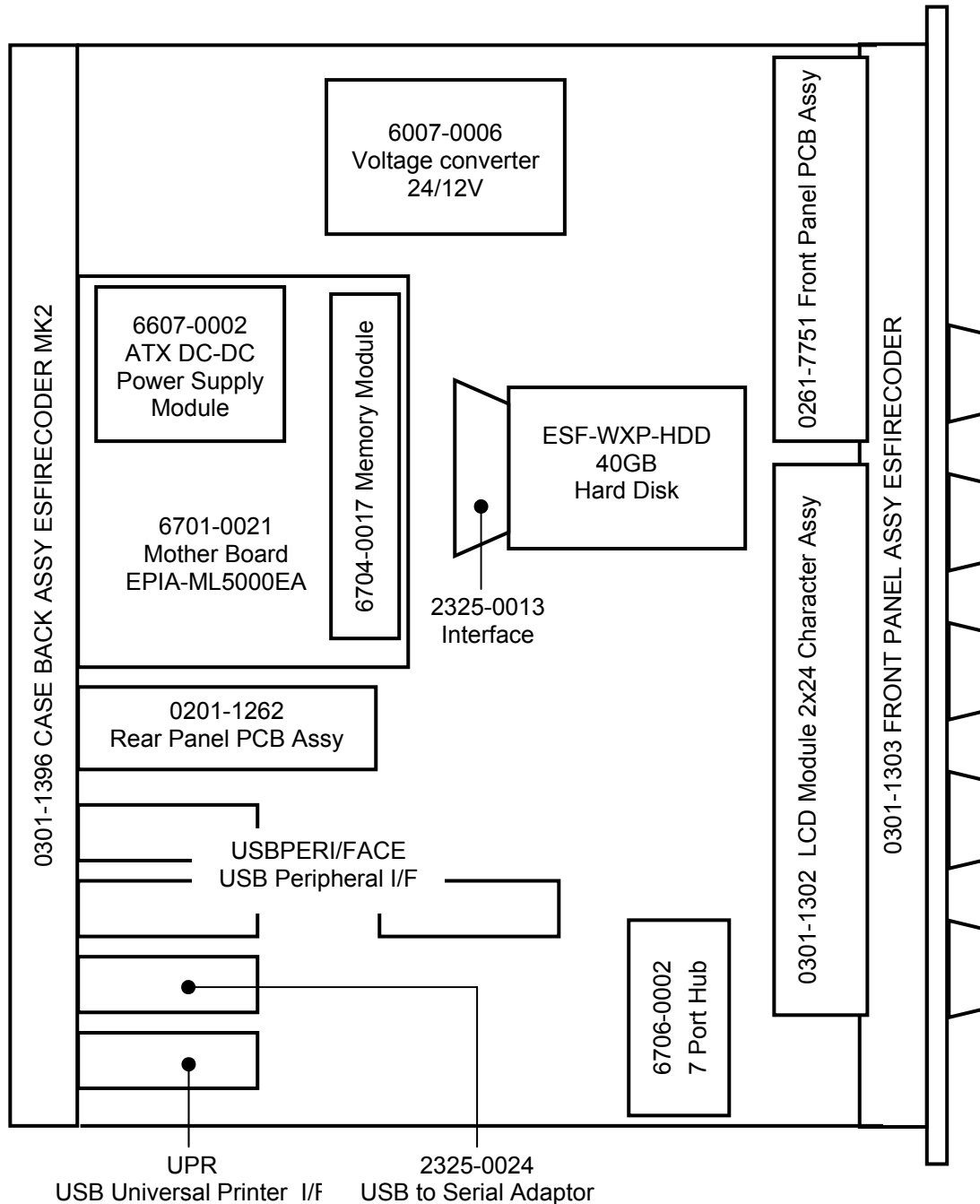
Static sensitive devices are used within this equipment. Care must be taken to ensure high levels of static electricity do not cause damage to these devices. Spare boards or components should be stored in anti-static packing when not installed in the equipment.

8.1 Block Diagram - ESFIRECODER



## ESFIRECODER - Emergency Services Firecoder

### 8.2 Block Diagram – ESFIRECODER-1 & ESFIRECODER-2



## ESFIRECODER - Emergency Services Firecoder

### 8.3 General Comments

The component parts of the ESFIRECODER are mechanical held together using metric Screws, Nuts and Washers. Before removing any part notes of any cable locations should be made. The Tables below will offer assistance.

Table 1 - ESFIRECODER				
Cable	From		To	
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "A" Port 1	UPI-1	
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "A" Port 2	UPI-2	
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "A" Port 3	UPI-3	
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "A" Port 4	UPI-4	
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "A" Port 5	0261-7751 Front Panel PCB	USB socket (un-marked)
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "B"	0261-7748 Rear Panel PCB Assy	SK5
7761-7969 Ribbon 10 way	6701-0021 Mother Board	F Audio	0261-7748 Rear Panel PCB Assy	PL3
7761-7970 Ribbon 10 way	6701-0021 Mother Board	Coms2	0261-7748 Rear Panel PCB Assy	PL2
7761-7971 Ribbon 10 way	6701-0021 Mother Board	USB 3/4	0261-7748 Rear Panel PCB Assy	PL5
7761-7967 Ribbon 16 way	6701-0021 Mother Board	F Panel	0261-7751 Front Panel PCB Assy	16 way Header (un-marked)
Flying Lead	6607-0002 ATX DC-DC	4 way Socket (un-marked)	0261-7751 Front Panel PCB Assy	4 way Header (un-marked)
Flying Lead	2325-0013 Interface	B & R	6607-0002 ATX DC-DC	4 way Socket (un-marked)
LCD Ribbon 16 way	0301-1302 LCD Module Assy	Con 1	0261-7751 Front Panel PCB Assy	16 way Header (un-marked)
7761-7807 Power Supply	6706-0002 7 Port Hub		0261-7751 Front Panel PCB Assy	2 way Header (un-marked)

## ESFIRECODER - Emergency Services Firecoder

Table 2 - ESFIRECODER-1 & ESFIRECODER-2				
Cable	From		To	
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "A" Port 1	UPI-1	
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "A" Port 2	UPI-2	
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "A" Port 3	UPI-3	
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "A" Port 4	UPI-4	
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "A" Port 5	0261-7751 Front Panel PCB	USB socket (un-marked)
7718-0033 USB 0.75m Long	6706-0002 7 Port Hub	USB "B"	0201-1262 Rear Panel PCB Assy	SK5
7761-8258 Ribbon 10 way	6701-0021 Mother Board	F Audio	0201-1262 Rear Panel PCB Assy	PL3
7761-8259 Ribbon 10 way	6701-0021 Mother Board	Coms2	0201-1262 Rear Panel PCB Assy	PL2
7761-8259 Ribbon 10 way	6701-0021 Mother Board	USB 3/4	0201-1262 Rear Panel PCB Assy	PL5
7761-7967 Ribbon 16 way	6701-0021 Mother Board	F Panel	0261-7751 Front Panel PCB Assy	16 way Header (un-marked)
Flying Lead	6607-0002 ATX DC-DC	4 way Socket (un-marked)	0261-7751 Front Panel PCB Assy	4 way Header (un-marked)
Flying Lead	2325-0013 Interface	B & R	6607-0002 ATX DC-DC	4 way Socket (un-marked)
LCD Ribbon 16 way	0301-1302 LCD Module Assy	Con 1	0261-7751 Front Panel PCB Assy	16 way Header (un-marked)
7761-7807 Power Supply	6706-0002 7 Port Hub		0261-7751 Front Panel PCB Assy	2 way Header (un-marked)

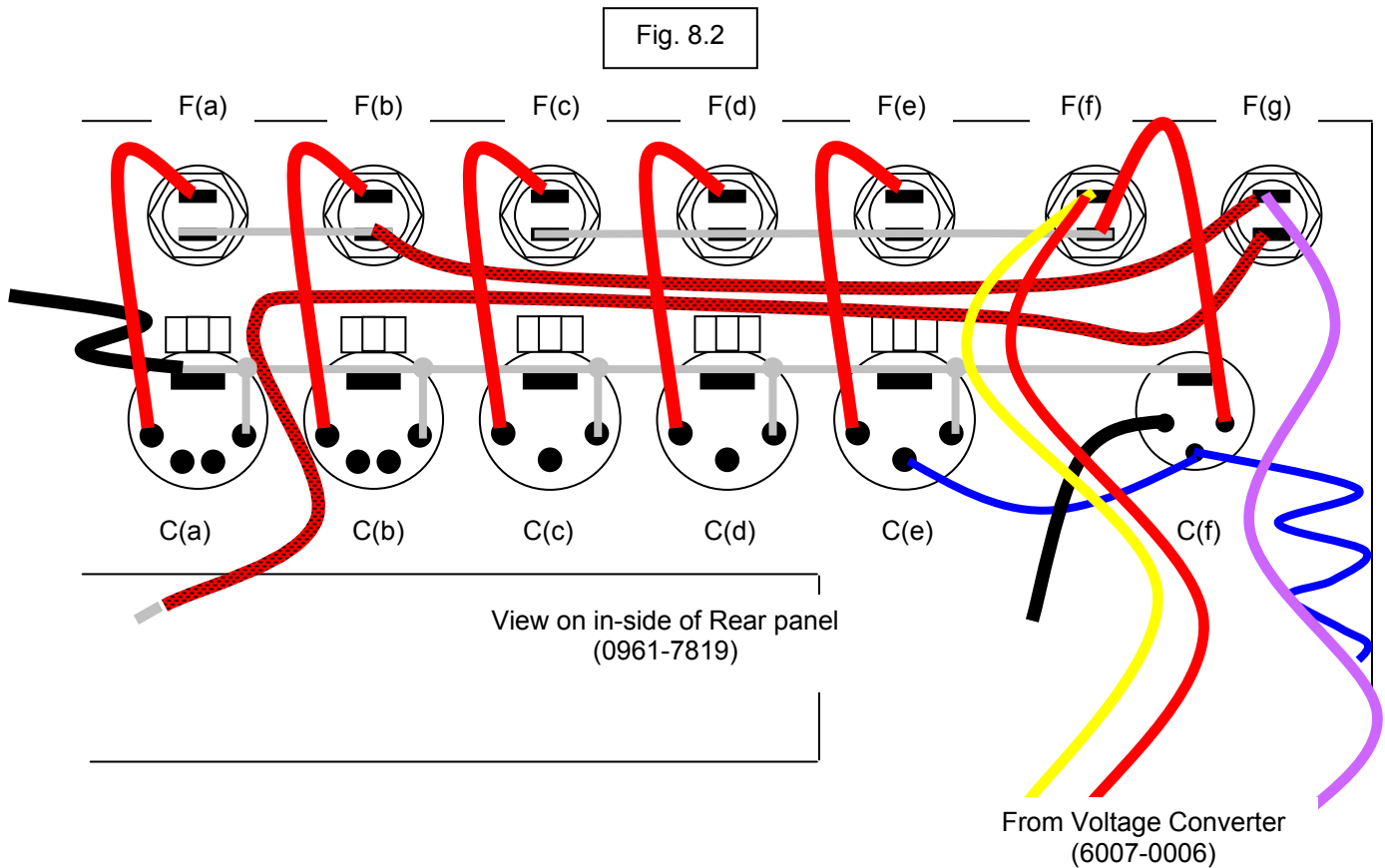
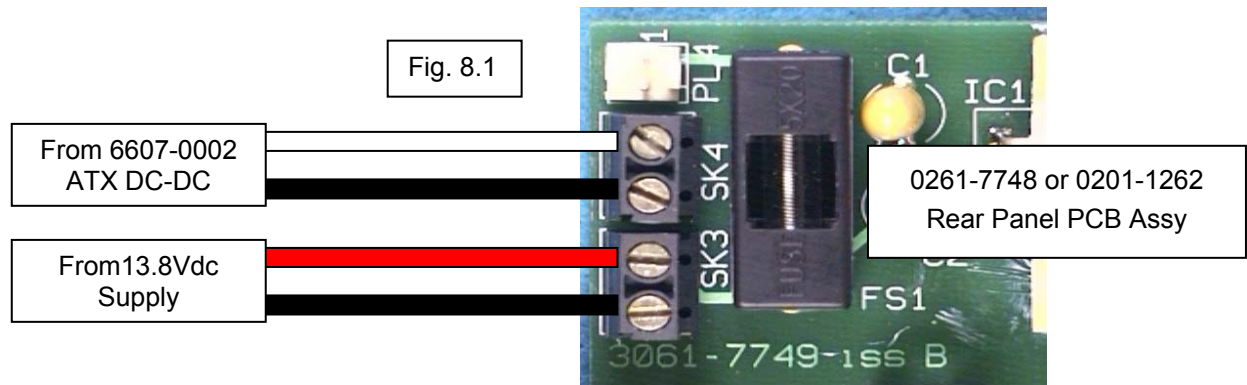
## ESFIRECODER - Emergency Services Firecoder

Table 3 - ESFIRECODER			
Cable	From		To
White lead	6607-0002 ATX DC-DC	+ (12Vdc +VE)	0261-7748 SK4 Rear Panel PCB Assy (Fig. 8.1)
Black lead		G (Ground)	
13.8Vdc +ve	6007-0006	Red Lead	0261-7748 SK3 Rear Panel PCB Assy (Fig. 8.1)
Ground		Black lead	
Black		Output (–ve)	Chassis Earth
Purple		Output (+ve)	F(g) Top (Fig 8.2)
Black		Input (–ve)	Chassis Earth
Red		Input (+ve)	F(f) Top (Fig 8.2)
Yellow		Input (+ve)	

Table 4 - ESFIRECODER-1 & ESFIRECODER-2			
Cable	From		To
White lead	6607-0002 ATX DC-DC	+ (12Vdc +VE)	0201-1262 SK4 Rear Panel PCB Assy (Fig. 8.1)
Black lead		G (Ground)	
13.8Vdc +ve	6007-0006	Red Lead	0201-1262 SK3 Rear Panel PCB Assy (Fig. 8.1)
Ground		Black lead	
Black		Output (–ve)	Chassis Earth
Purple		Output (+ve)	F1 Top (Fig 8.3)
Black		Input (–ve)	Chassis Earth
Red		Input (+ve)	F2 Bottom (Fig 8.3)
Yellow		Input (+ve)	

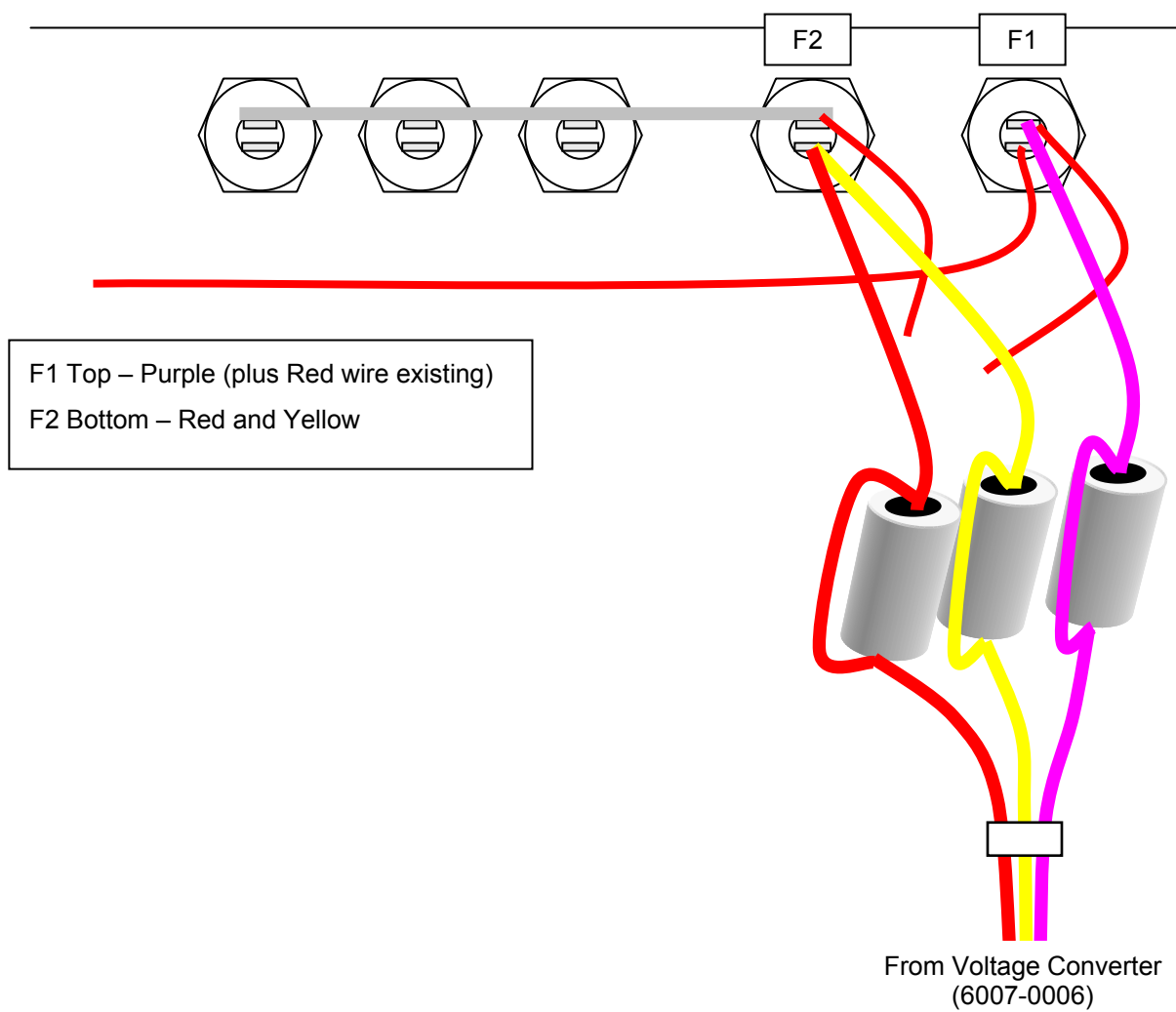


## ESFIRECODER - Emergency Services Firecoder



## ESFIRECODER - Emergency Services Firecoder

Fig. 8.3



## ESFIRECODER - Emergency Services Firecoder

### 8.4 Replacing the Mother Board (6701-0021)

If the Mother Board is replaced the following Bios Settings will be required.

Menu	Option	Setting
► Standard CMOS Features	Date (mm:dd:yy) Time (hh:mm:ss) Halt On	Current date Current time All, But Keyboard
► Advance BIOS Features	Virus Warning CPU L2 Cache ECC Checking Quick Power On Self Test First Boot Device Second Boot Device Third Boot Device Boot Other Device Boot Up NumLock Status Typematic Rate Setting Typematic Rate (Chars/Sec) Typematic Delay (Msec) Security Option Display Full Screen Logo Show Summary Information Display Small Logo	Disabled Enabled Enabled HDD-0 Disabled Disabled Enabled On On Enabled 30 250 Setup Disabled Disabled
► Advance Chipset Features	AGP Aperture Size AGP Mode (Internal) CPU to PCI POST Write Select Display Device Panel Type CPU Direct Access FB	128 4X Enabled CRT 1024*768 Enabled

## ESFIRECODER - Emergency Services Firecoder

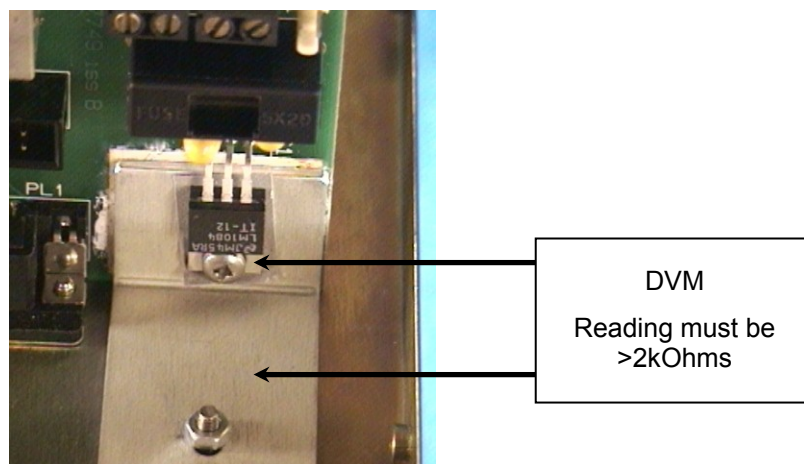
Menu	Option	Setting
► Integrated Peripherals	Onboard IDE Channel 2 Onboard IDE Channel 1 IDE Prefetch Mode Display Card Priority Frame Buffer Size AC97 Audio MC97 Audio VIA OnChip LAN USB Keyboard Support Onboard LAN Boot ROM Onboard Fast IR Fast IR IRQ Fast IR DMA	Enabled Enabled Enabled PCI Slot 32M Auto Auto Enabled Enabled Disabled Disabled -- --
► SuperIO Device	Onboard Serial Port 1 Onboard Serial Port 2 Onboard Parallel Port Parallel Port Mode EPP Mode Select ECP Mode Use DMA	3F8/IRQ4 2F8/IRQ3 378/IRQ7 SPP -- --
► Power Management Setup	ACPI Suspend Type HDD Power Down Power Management Timer Video Off Option Power Off by PWRBTN Run VGABIOS if S3 Resume AC Loss Auto restart  ► Peripherals Activities ► IRQs Activities	S1(POS) Disabled Disabled Suspend -> Off Delay 4 Seconds Auto On  Use BOIS defaults Use BOIS defaults
► PnP / PCI Configurations		Use BOIS defaults
► PC Health Status		Use BOIS defaults
► Frequency / Voltage Control		Use BOIS defaults
Save & Exit Setup		F10 (Save & Exit Setup)

For an additional information <http://www.via.com.tw/en/products/mainboards/>

## ESFIRECODER - Emergency Services Firecoder

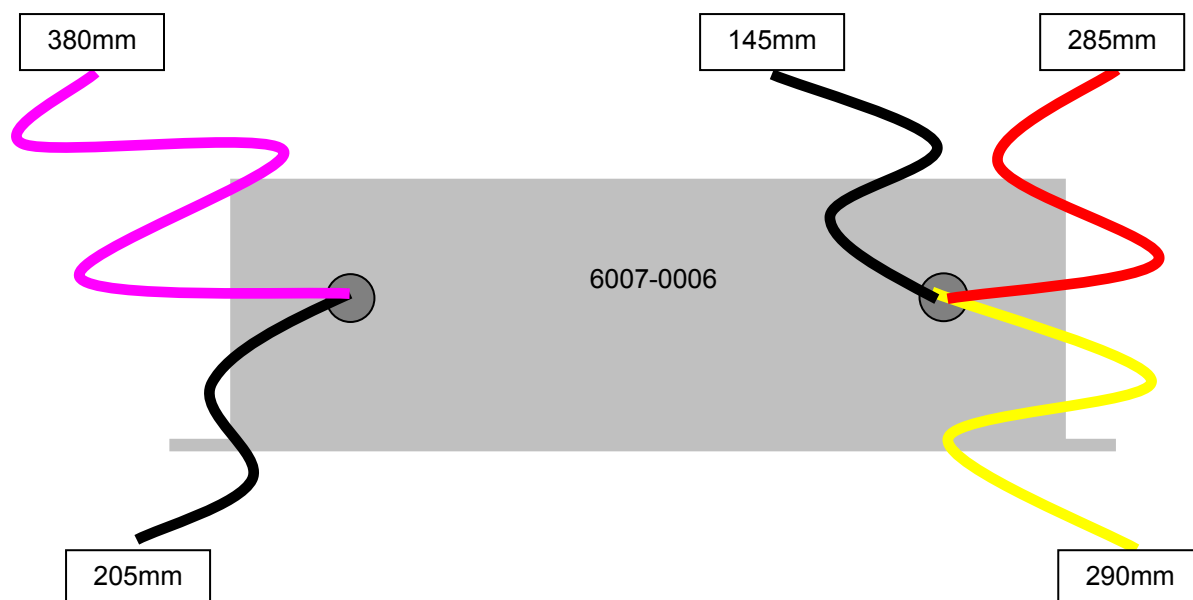
### 8.5 Replacing the Rear Panel PCB Assembly (0261-7748 or 0201-1262)

When replacing the Rear Panel PCB Assembly before powering up check for “>2kOhms” between the mounting tab of IC1 and the Heatsink.



### 8.6 Replacing the Voltage converter 24/12V (6007-0006)

#### 8.6.1 Cut the cables as detailed



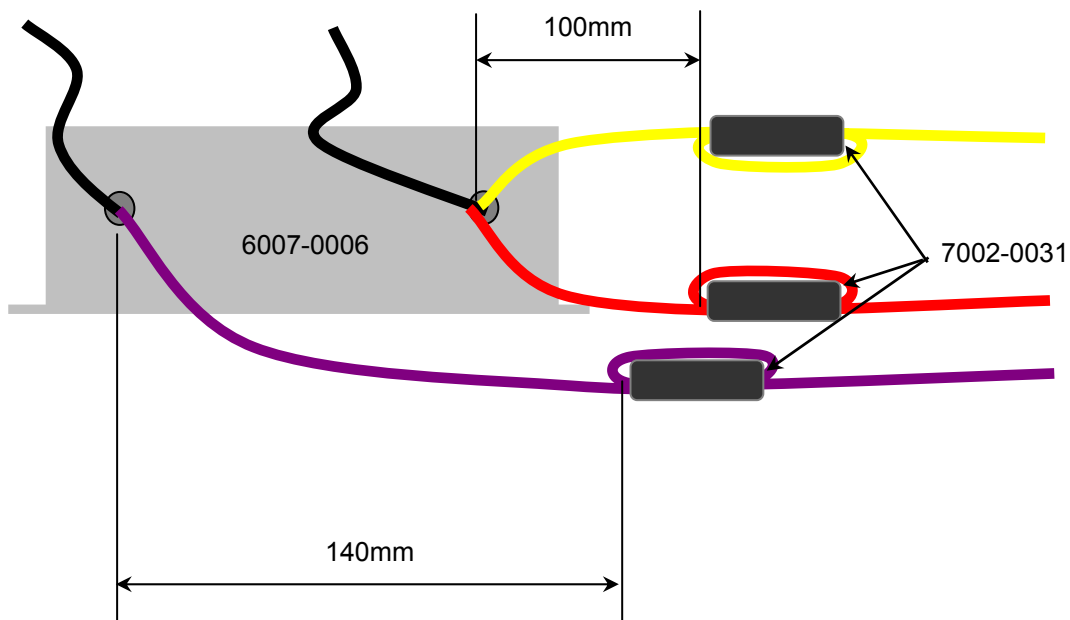
8.6.2 Strip back by 5mm the Red, Yellow and Purple cables and tin the ends.

8.6.3 Strip both Black cables and crimp with crimp part number (0909029)

8.6.4 Once you have tinned the Red, Yellow and Purple cables fit the ferrites (7002-0031) to the 3 cables by sliding them down to the specified length (shown below) then looping the cable around and back through the ferrite ring (7002-0031)

## ESFIRECODER - Emergency Services Firecoder

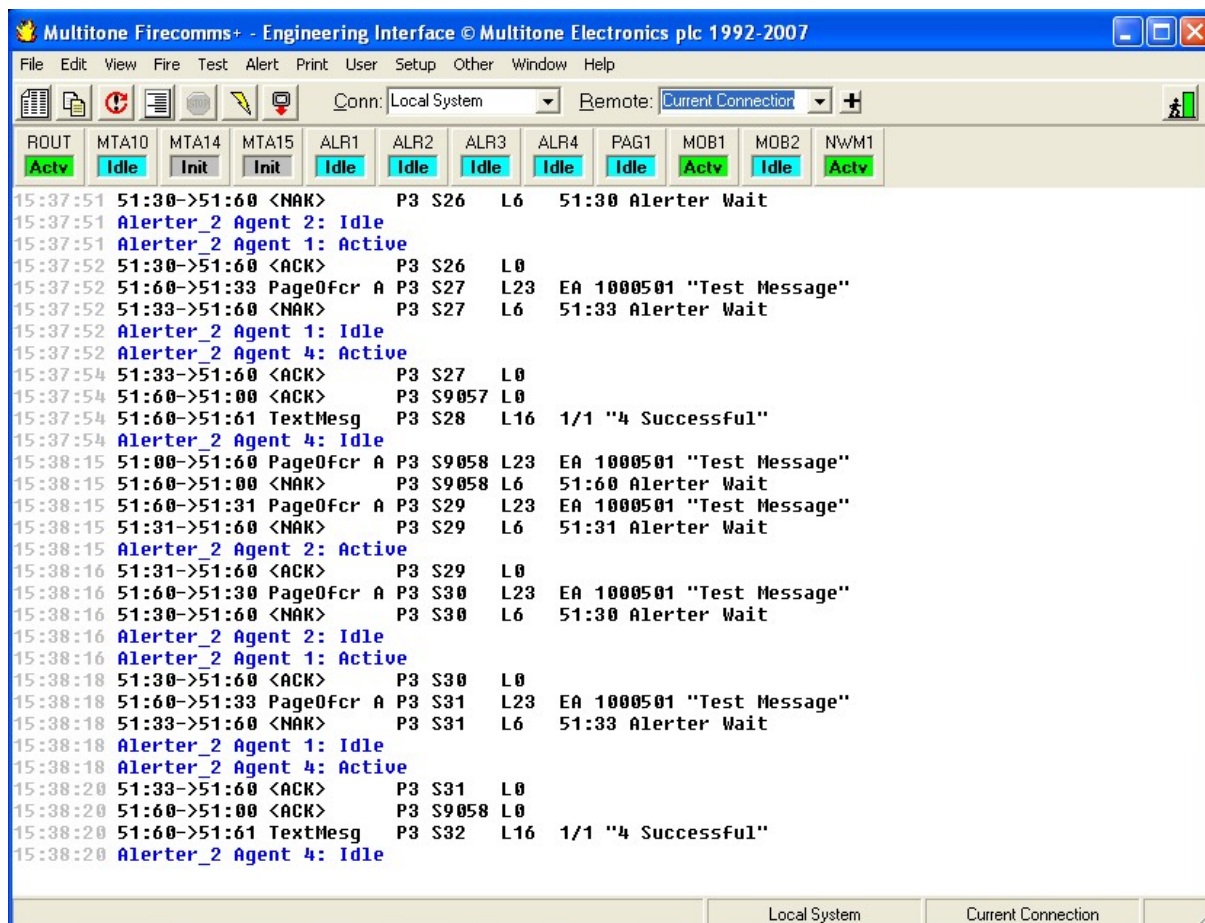
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## ESFIRECODER - Emergency Services Firecoder

### SECTION 9 – Typical Software Screen Dumps

#### MFW Engineering Software Main Screen





ESFIRECODER - Emergency Services Firecoder

IP Connection List & Remote Nodes

IP Connection List

Edit Connection List

	Connection Name	IP address and Port
1	MiniItX	192.168.0.11:6000
2	ESFirecoder	192.168.0.99:6000
3	Test Station	10.2.10.100:6000
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		

Update

Apply

Cancel

Remote Nodes List

Edit Node List

	Node Name	GD-92 Node
1	ESFirecoder	099:0003
2	Test Station	050:0101
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Update

Apply

Cancel



## ESFIRECODER - Emergency Services Firecoder

### Editing Agent Parameters

Agent Selection

**Edit Non-Vol Parameter: Select Agent**

Router  
MTA 1 (PrvWire)  
MTA 2 (LAN)  
MTA 3 (PSTN)  
MTA 4 (ISDN)  
Peripheral Agent 1  
Peripheral Agent 2  
Peripheral Agent 3  
Printer Agent 1  
Alerter\_2 Agent 1  
Console Agent 4  
Paging Agent 1  
Sound Agent 1  
Mobilise Agent 1  
<Add New Agent>

Edit      Quit

Route Parameters

**Router: Select Non-Vol Parameter**

Agent Manager  
Description  
Monitor Log To Disk  
Local Brigade Number  
Local Node number  
Node name  
Password1  
Password2  
Password3  
Password4  
Max Packet Length  
Primary Network Manager  
Secondary Network Manager  
Tertiary Network Manager  
Router table  
PSTN Table  
ISDN Table  
GSM Table  
WAN Table  
UDP Table  
Application Level Timeout  
Manual Acknowledge Timeout  
File Transfer Timeout  
Message Retries  
Radio table  
Datalog everything  
System mode  
Station code  
Duplicate System Monitor MTA  
Duplicate System Node  
Engineering Listen Port  
Engineering Timeout  
Use Engineering Phone Number  
History Display  
Message display  
Max log file size (MB)  
Log File Path  
Longitude Offset  
System Latitude  
Destinations  
Software Version

Edit      Quit

LAN MTA

**LAN 14: Select Non-Vol Parameter**

Port Number  
Agent Type  
Agent Manager  
Description  
Monitor Log To Disk  
MTA Status  
Notify status changes  
Min priority for MTA  
Connected to  
Listen Port  
Protocol Tweaks  
Remote Address  
Verify period  
Verify timeout  
Inhibit Loopback  
Max Connection Retry Time (S)

Edit      Quit

## ESFIRECODER - Emergency Services Firecoder

### Editing Agent Parameters

Routing Table

Router table: Current Router table

	NextNode	First-Last	Bearer	Used	Pref
1	099:0099	000:0000-000:0000	ProWire	Y	1
2	099:0099	000:0000-000:0000	LAN	Y	2
3	099:0099	000:0000-000:0000	PSTN	Y	3
4	099:0099	000:0000-000:0000	ISDN	Y	4
5	099:0099	000:0000-000:0000	Asynch	Y	5
6	099:0099	000:0000-000:0000	WAN	Y	6
7	000:0000	000:0000-000:0000	None		0
8	000:0000	000:0000-000:0000	None		0
9	000:0000	000:0000-000:0000	None		0
10	000:0000	000:0000-000:0000	None		0
11	000:0000	000:0000-000:0000	None		0
12	000:0000	000:0000-000:0000	None		0
13	000:0000	000:0000-000:0000	None		0
14	000:0000	000:0000-000:0000	None		0
15	000:0000	000:0000-000:0000	None		0
16	000:0000	000:0000-000:0000	None		0

Update Apply Cancel

Peripheral Agent

Peripheral 1: Select Non-Vol Parameter

Port Number

Agent Type

Unsolicited Message Address

Unsolicited Message Priority

Device Name

Agent Manager

Description

Monitor Log To Disk

Alarm Regen Time

Output 0

Output 1

Output 2

Output 3

Output 4

Output 5

Output 6

Output 7

Output 8

Output 9

Output 10

Output 11

Output 12

Output 13

Output 14

Output 15

Input 0

Input 1

Input 2

Input 3

Input 4

Input 5

Input 6

Input 7

Input 8

Input 9

Input 10

Input 11

Input 12

Input 13

Input 14

Input 15

Printer Address

Alerter Address

Tone Decode Mask

Repeated Tone Sequence

Edit Quit

ESFIRECODER - Emergency Services Firecoder

Editing Agent Parameters

Alerter Agent

Alerter Agent

Alerter\_2 1: Select Non-Vol Parameter

Port Number

Agent Type

Unsolicited Message Address

Unsolicited Message Priority

Device Name

Agent Manager

Description

Monitor Log To Disk

1200 baud Paging

Manchester Encoding

Decoder Mode

Dual Transmitters

Dual Aerials

TX Key Delay (mS)

Invert Data Output

Invert TX Key Outputs

Invert Voice Key Output

Invert TX Alarm Inputs

Forwarding Address

Forwarding Delay

Forwarding Timeout

Mk7 System Number

Pocsag InRange Mode

Mk7 InRange Mode

Mk7 Datestamp Interval

Overlap Call Delay (mS)

Repeat Interval (mS)

Verify Time (mS)

All Alarms to Unsol

Alerter Directory

Emergency Page Format

Priority Page Format

Routine Page Format

Admin Page Format

Coverage Test Interval (S)

Edit Quit

Alerter Directory

Alerter Directory: Non-Vol Alerter Directory

	User	Address	Format	Message
1	FA	11501	3AR	Fire Team A
2	FB	11502	3AR	Fire Team B
3	FC	11503	3AR	Fire Team C
4	TA	11501	1A	Test Team A
5	TB	11502	1A	Test Team B
6	TC	11503	1A	Test Team C
7	EN	1999999	0A	Engineering
8	*		A	
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				

Update Apply Cancel



ESFIRECODER - Emergency Services Firecoder

MFU User Interface Software

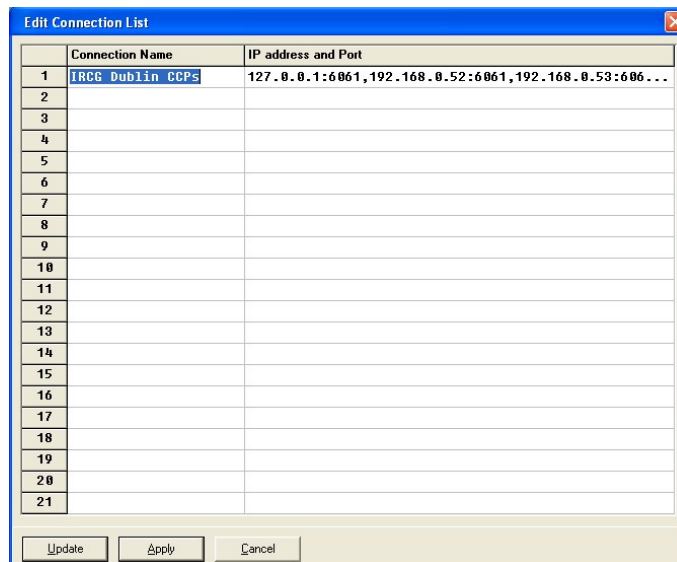
Main Screen



## ESFIRECODER - Emergency Services Firecoder

### MFU User Interface Software

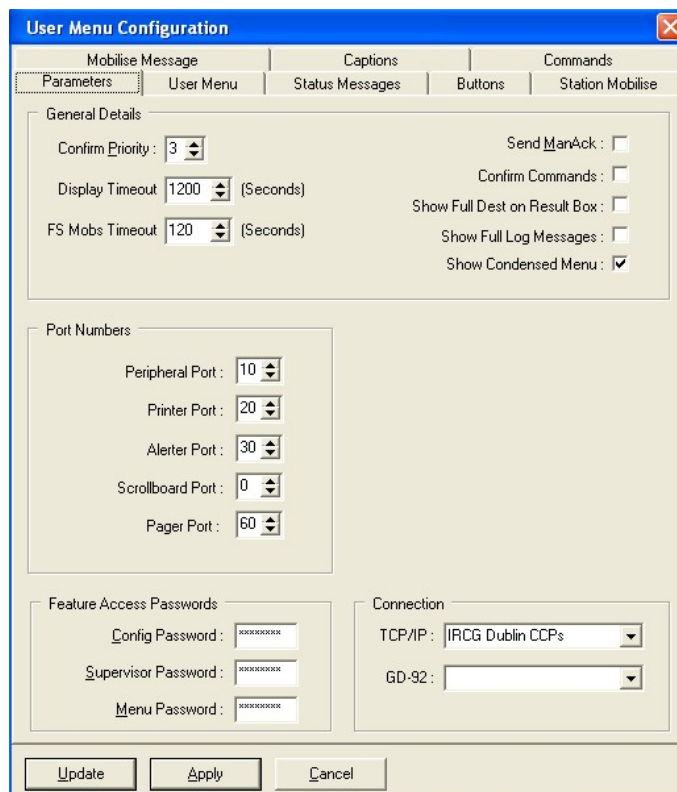
#### MFU Connection List



Dialog box titled "Edit Connection List" showing a table of connections. The table has two columns: "Connection Name" and "IP address and Port". The first row is selected and contains "IRCG Dublin CCPs" and "127.0.0.1:6061,192.168.0.52:6061,192.168.0.53:6061...". The table has 21 rows in total. Below the table are buttons for "Update", "Apply", and "Cancel".

	Connection Name	IP address and Port
1	IRCG Dublin CCPs	127.0.0.1:6061,192.168.0.52:6061,192.168.0.53:6061...
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
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17		
18		
19		
20		
21		

#### MFU Menu Configuration



Dialog box titled "User Menu Configuration" with tabs: Mobilise Message, Captions, Commands, Parameters (selected), User Menu, Status Messages, Buttons, Station Mobilise. The "Parameters" tab is active, showing "General Details" and "Port Numbers" sections.

**General Details**

- Confirm Priority: 3
- Display Timeout: 1200 (Seconds)
- FS Mobs Timeout: 120 (Seconds)
- Send ManAck: ☐
- Confirm Commands: ☐
- Show Full Dest on Result Box: ☐
- Show Full Log Messages: ☐
- Show Condensed Menu: ☒

**Port Numbers**

- Peripheral Port: 10
- Printer Port: 20
- Alertor Port: 30
- Scrollboard Port: 0
- Pager Port: 60

**Feature Access Passwords**

- Config Password: [Masked]
- Supervisor Password: [Masked]
- Menu Password: [Masked]

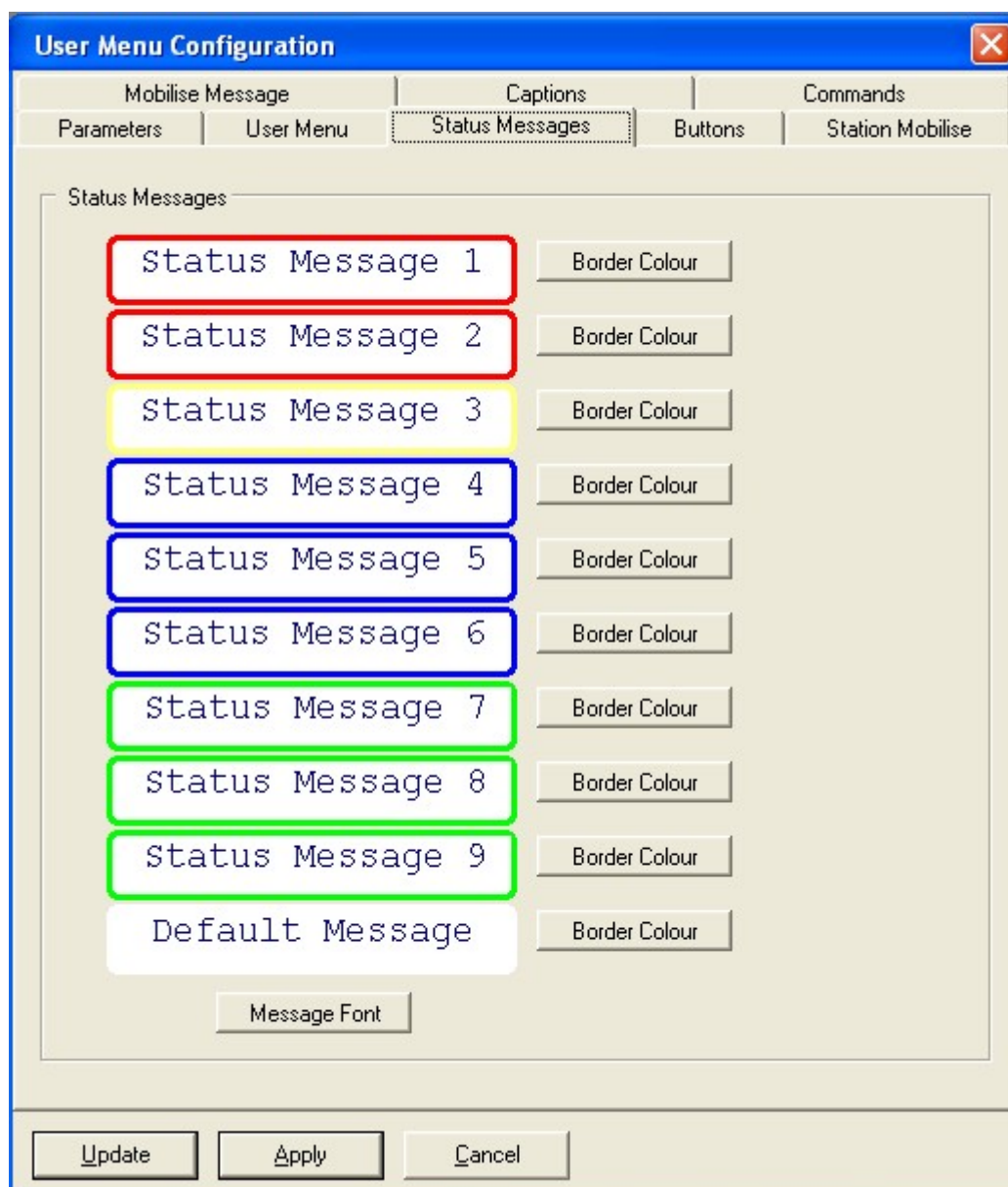
**Connection**

- TCP/IP: IRCG Dublin CCPs
- GD-92: [Empty]

Buttons: Update, Apply, Cancel

**ESFIRECODER - Emergency Services Firecoder****MFU User Interface Software**

## MFU Status Messages



The image shows a screenshot of the 'User Menu Configuration' dialog box. The 'Status Messages' tab is selected. It displays a list of status messages from 1 to 9, each with a 'Border Colour' button next to it. The messages are: Status Message 1, Status Message 2, Status Message 3, Status Message 4, Status Message 5, Status Message 6, Status Message 7, Status Message 8, Status Message 9, and Default Message. Below the list is a 'Message Font' button. At the bottom of the dialog are 'Update', 'Apply', and 'Cancel' buttons.

Mobilise Message	Captions	Commands
Parameters	User Menu	Status Messages

Status Messages

Status Message 1	Border Colour
Status Message 2	Border Colour
Status Message 3	Border Colour
Status Message 4	Border Colour
Status Message 5	Border Colour
Status Message 6	Border Colour
Status Message 7	Border Colour
Status Message 8	Border Colour
Status Message 9	Border Colour
Default Message	Border Colour

Message Font

Update Apply Cancel

## ESFIRECODER - Emergency Services Firecoder

### MFU User Interface Software

#### User Menu



The dialog box is titled "User Menu Configuration" and has a close button (X) in the top right corner. It features a tabbed interface with the following tabs: Mobilise Message, Captions, Commands, Parameters, User Menu (selected), Status Messages, Buttons, and Station Mobilise.

The main content area displays a preview of the user menu configuration. The preview shows a dark blue header with the text "Coast Guard User Menu - Operc". Below the header, there is a light blue area with the text "Navigation", "Menu Item", and "Caption" in different colors (blue, green, and red respectively). At the bottom of the preview, there is a pink bar with the text "00:00:00 BLUE RED BLACK GREEN".

Below the preview, there is a section titled "User Menu Setup (or click on objects above)". This section contains several input fields and buttons:

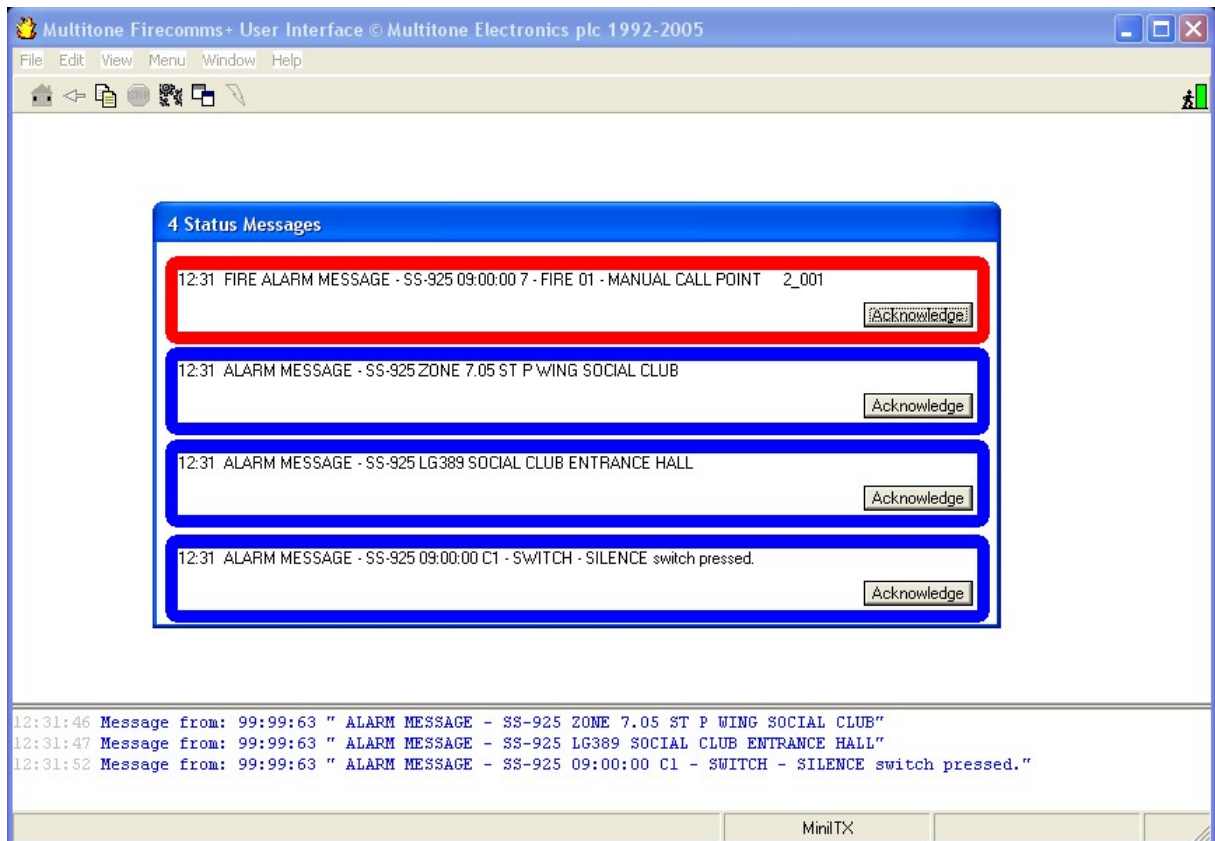
- Menu Title: Irish Coast Guard User Menu - Operator 1
- Title Font
- Title Background
- Border Colour
- Left Image
- Right Image
- Navigation Font
- Menu Item Font
- Menu Background
- Caption Font
- Log Background

At the bottom of the dialog box, there are three buttons: Update, Apply, and Cancel.

## ESFIRECODER - Emergency Services Firecoder

### MFU User Interface Software

MFU Main Screen with four unacknowledged messages

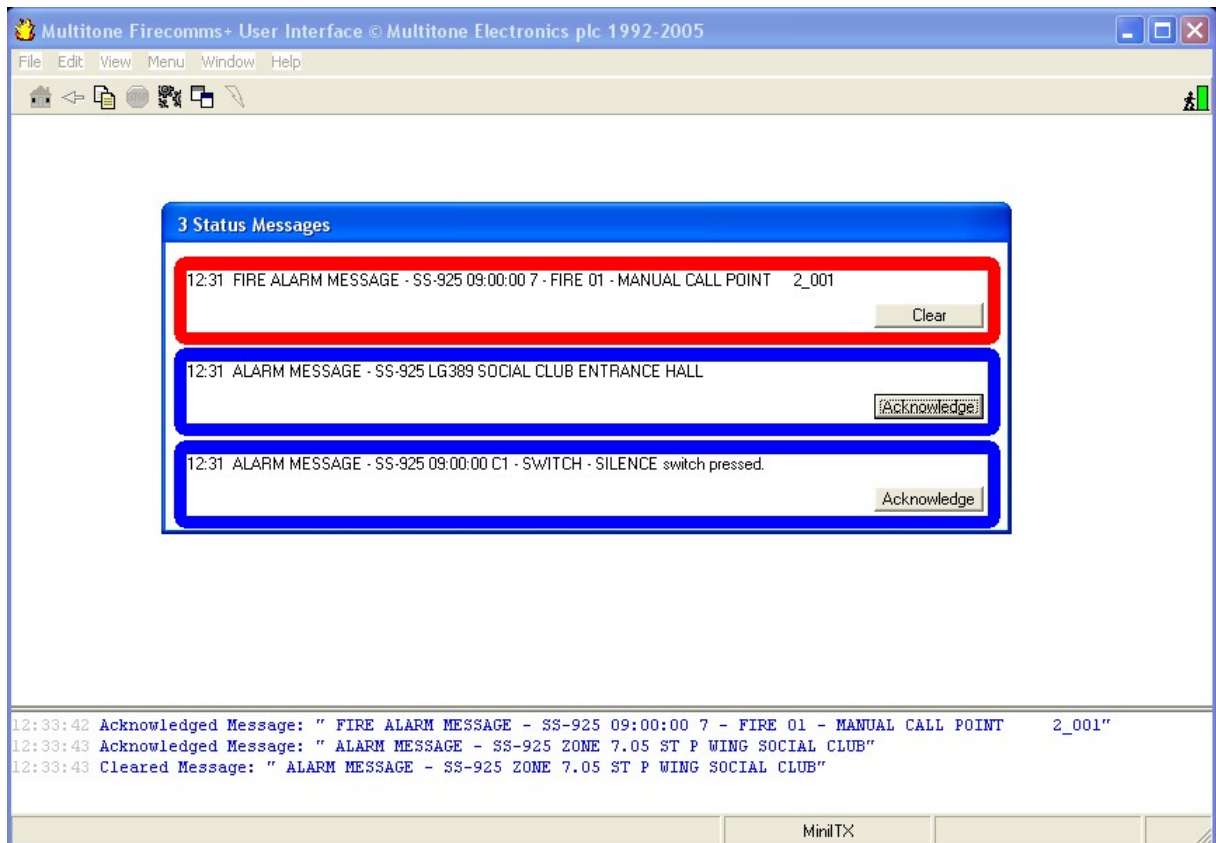




## ESFIRECODER - Emergency Services Firecoder

### MFU User Interface Software

MFU Main Screen with one acknowledged message and two unacknowledged messages



## ESFIRECODER - Emergency Services Firecoder

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### SECTION 10 – Compliance Information

**EU:** - This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

#### **WARNING**

Do not install / use this equipment in areas where explosive gases may be present, or it may be exposed to liquids, strong magnetic fields, extreme temperatures or strong sunlight.

#### **Installation Notes**

This equipment has been designed to conform to the relevant EMC performance standards, but it may be necessary to take additional precautions during installation, to ensure continued compliance.

Use only cables supplied, or suitably rated power cables and screened signaling cable. Where quoted, do not exceed specified cable lengths.

Keep cable runs to a minimum, especially on the outside of buildings and do not unnecessarily route wiring alongside cables from or through areas that are a source of interference e.g. heavy plant and switch rooms, RF transmitter housings, without taking suitable precautions to reduce EM interference coupling. Where necessary, use additional protection e.g. armoured trunking, surge arrestors, especially on the outside of buildings.

Where any interference problems are observed, it may be required to fit additional filtering components such as ferrite absorbers, or in-line filters. If such action proves to be necessary, contact either Multitone or their authorised agents.

#### **Connection of Power Supplies**

Use only power sources specified, or supplied by Multitone. The use of another device will invalidate any declared conformity for this equipment, if as a result it ceases to conform with those standards on which conformity is based.